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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Crops Research Division
Vegetables and Ornamentals Research Branch
Potato Investigations
Beltsville, Maryland

THE NATIONAL POTATO-BREEDING PROGRAM, 1964

By
Robert V. Akeley and Others
and
State Cooperators

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Beltsville, Maryland

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DISCLAIMER

Trade names are used in this publication only to provide specific information. Their use does not constitute a guarantee of the products named and does not signify that they are approved by the U. S. Department of Agriculture to the exclusion of others of suitable composition.

PRECAUTIONS

Chemical compounds to control potato insects and diseases are poisonous; handle them with care. Follow directions and heed all precautions on container labels.

Chemical compounds should be kept in closed, well-labeled containers in a dry place where they will not contaminate food or feed, and where children and pets cannot reach them.

Observe good hygiene when handling chemical compounds. Wear clean clothing. Avoid repeated or prolonged contact of chemicals with the skin. Do not inhale dusts or mists. Wash hands and face before eating or smoking.

Calcium arsenate, DDT, Kelthane, malathion, metaldehyde, methoxychlor, Sevin, and sulfur can be used safely without special protective clothing or devices if they are in diluted dust or water-spray forms.

Most chemical concentrates require special precautions in handling. Avoid spilling them on the skin; keep them out of the eyes, nose, and mouth. If you spill concentrate on skin or clothing, wash it off the skin and change clothing immediately. If it gets in the eyes, flush them with plenty of water for 15 minutes, and get medical attention.

Aldrin, chlordane, diazinon, dieldrin, endosulfan (Thiodan), and toxaphene can be absorbed directly through the skin in harmful quantities. When working with these chemicals in any form, take the same precautions as with concentrates.

Endrin, Guthion, and parathion, are extremely poisonous and may be fatal if swallowed, inhaled, or absorbed through the skin. Carbophenothion (Trithion) is highly toxic if inhaled or swallowed; it is less toxic by skin contact. These chemicals should be applied only by a person thoroughly familiar with their hazards who will assume full responsibility for safe use and comply with all precautions on the labels. When using these insecticides, reduce the danger of skin exposure by wearing recommended protective clothing and equipment.

Do not transfer ethylene dibromide from one container to another in a closed room; do not breathe the fumes.

To protect fish and wildlife, be careful not to contaminate streams, lakes, or ponds with chemicals. Do not clean spraying equipment or dump excess spray material near such water. Avoid contaminating pasture grass or feed.

PLANT INDUSTRY STATION (Beltsville, Md.) and
CHAPMAN AND AROOSTOOK FARMS (Presque Isle, Maine)
R. V. Akeley, A. E. Schark, R. W. Buck, Jr., W. B. Raymer
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G. V. C. Houghland, and G. W. Pittarelli

Plant Industry Station

In the greenhouses (1964) at Plant Industry Station, Beltsville, Maryland, 92 parents were planted and over 175 seed lines of various combinations were obtained. The following disease-resistant factors were involved: late and early blight; common and powdery scab; ring rot; leafroll and net necrosis; verticillium wilt; brown rot; corky ringspot; viruses X, A, Y, S, and spindle tuber; and resistance to insects, nematodes, and tuber-greening. Other characters involved were: skin color (red, white, russet, and yellow), high solids, processing qualities, yield, fertility, and maturity. Approximately 45,150 seedlings from 168 families were grown from true seed to tubers in the greenhouses and distributed to cooperators. A total of 61,400 potato seeds from 116 families were also distributed to co-operators.

Distribution

The distribution of potato seed, new seedlings, advance selections, and named varieties continued in 1964. A summary of the shipments is given in P. I. tables 1, 2, and 3. The true seed, new seedlings, and small lots of tubers were sent from the Plant Industry Station, but most of the larger shipments were made directly from Maine.

P. I. table 1. Distribution of potato seed and new seedlings from the greenhouses at Beltsville, Maryland, 1964.

Country or State	Cooperator	Number of Progenies	Number of Tubers	Seeds
Brazil	K. M. Silberschmidt	1		300
California	B. S. Milliken	1		1,000
California	R. L. Noveroske	1		2,000
Colorado	S. A. Alfieri	104	14,360	
Ethiopia	L. A. Yager	13		3,100
Idaho	L. L. Sanford	49	7,793	
Indiana	H. T. Erickson	70		36,300
Louisiana	T. R. Dykstra	29		200
Madagascar	R. Rasolofo	1		18,500
Maine	A. E. Schark	218	42,000	
West Virginia	M. E. Gallegly	37	5,400	
Wisconsin	W. Beale	73	13,364	

P. I. table 2. Distribution of named and numbered varieties to foreign countries, 1964.

Country	Cooperator	Number of Varieties	Country	Cooperator	Number of Varieties
Africa	L. A. Beery	8	Israel	A. Rubinstein	1
Argentina	C. J. Induni	109	Israel	A. Stein	2
Argentina	E. G. Valente	1	Iceland	R. McDonogh	2
Australia	L. R. Kavanagh	7	Italy	L. Fenaroli	2
Belgium	V. Melard	21	Korea	C. I. Choi	36
Canada	G. Bouraka	20	Korea	W. Rogers	3
Canada	E. Campayne	8	Madagascar	R. Rasolofo	2
Canada	G. R. Johnston	48	Martinique	H. H. Fisher	36
Canada	A. R. Manzer	28	Mexico	J. S. Niederhauser	151
Canada	J. A. Menzies	40	Mexico	J. Cervantes	7
Canada	L. C. Young	37	New Zealand	R. G. Robinson	3
Ceylon	K. Caesar	36	Poland	C. O. Erlanson	6
Chile	A. Mathieu K.	36	South Africa	L. L. Roux	44
Colombia	C. DeViboral	4	Southern		
Holland	J. H. Pott	2	Rhodesia	T. de Carvalho	17
Holland	I. W. Prummel	11	Russia	H. L. Hyland	2
Holland	A. Walf	36	Tasmania	P. Fountain	15
India	H. Kishore	36	West Germany	V. Warenbermittlung	1
Indonesia	P. K. Hwie	36	West Indies	A. J. Vltor	1
			Venezuela	A. Montaldo	9

P. I. table 3. Distribution of named and numbered varieties to states, 1964.

State	Cooperator	Number of Varieties	State	Cooperator	Number of Varieties
Alabama	S. T. Jones	12	Iowa	J. Weigle	4
Alaska	C. H. Dearborn	10	Kansas	J. K. Greig	2
Arizona	N. F. Oebker	20	Louisiana	J. C. Miller	4
California	W. R. Carrin	36	Maine	P. J. Eastman	28
California	G. N. Davis	32	Maine	J. Rideout	1
Colorado	S. A. Alfieri	5	Maine	A. E. Schark	4
Connecticut	A. Hawkins	29	Maryland	W. W. Anderson	24
Connecticut	S. S. Patil	2	Maryland	G. V. C. Houghland	4
Delaware	E. P. Brasher	17	Maryland	R. Kaufman	3
Florida	E. N. McCubbin	55	Maryland	R. Miller	2
Georgia	J. E. Bailey	13	Massachusetts	M. E. Weeks	18
Georgia	W. S. Murphy	23	Michigan	N. Thompson	2
Hawaii	J. A. Crozier	36	Minnesota	O. C. Turnquist	2
Idaho	J. Gregory	28	Mississippi	C. C. Singletary	10
Idaho	C. S. Hulan	1	Missouri	V. M. Lambeth	2
Idaho	Kuenemann	1	Nebraska	D. Nuland	2
Idaho	D. B. Robertson	28	Nebraska	R. O'Keefe	2
Idaho	L. L. Sanford	8	New Jersey	J. C. Campbell	43
Indiana	J. Bowers	2			

continued

P. I. table 3, continued.

State	Cooperator	Number of Varieties	State	Cooperator	Number of Varieties
New Jersey	C. E. Cunningham	153	Ohio	J. Lawrence	1
New York	F. Ashworth	1	Oregon	W. E. Sieveking	1
New York	R. Cetas	36	Pennsylvania	J. D. Harrington	25
New York	E. Ewing	22	Pennsylvania	E. F. Hoover	17
New York	R. Plaisted	7	Pennsylvania	W. Mills	14
New York	L. C. Peterson	93	Rhode Island	R. S. Bell	15
New York	R. L. Sawyer	19	South Dakota	C. Nagel	2
North Carolina	F. Haynes	14	Texas	J. M. Coruthers	18
North Carolina	L. W. Nielsen	1	Virginia	M. M. Parker	16
North Dakota	R. Johansen	2	Washington	R. Kunkel	11
North Dakota	B. Picha	2	West Virginia	M. E. Gallegly	16
Ohio	F. Lower	9	Wisconsin	M. Rominsky	11
Ohio	G. Marlowe	2	Wisconsin	P. R. Rowe	3
Ohio	G. P. Slesman	35	Wisconsin	J. Schoenemann	2

Chapman Farm

A summary of the maturity and fertility data on the new 10-hill rows grown on the Chapman Farm in 1964 is given in P. I. table 4. Field fertility was judged by comparing the 10-hill seedling selections with the standard varieties, Irish Cobbler (early), Kennebec (midseason), and Green Mountain (late). Fertility was measured by the relative number of seedballs produced per plant. Wide variations in the number of seedballs produced from year to year are caused by climatic conditions at the time of flowering and seedball formation. About 294 seedlings (38.8 percent) of the 757 selections observed were rated as midseason in maturity. This was the largest maturity class. Thirty-one (4 percent) of the selections were very early in maturity. Over five hundred (67.2 percent) of the 757 selections observed were medium to good in fertility, and only 198 (26.2 percent) failed to set seedballs. In 1962, 84.4 percent of the selections were unfruitful, but some fertility was noted in over 73 percent of the selections checked this year.

P. I. table 4. Maturity and fertility of seedlings grown in 10-hill rows on Chapman Farm, 1964.

Maturity Classes	Seedlings		Fertility Classes	Seedlings	
	No.	Pct.		No.	Pct.
Very early	31	4.1	None	198	26.2
Early	233	30.8	Slight	46	6.1
Medium	294	38.8	Medium	509	67.2
Late	199	26.3	Good	4	0.5
Total	757	100.0		757	100.0

About 50,926 seedling tubers, 230 family lines, were grown in the greenhouses at Beltsville, Maryland, and Riverton, New Jersey, and were replanted for single-hill increase on the Chapman Farm in 1964 (P. I. table 5). Of this total, 48,149 (94.5 percent) were grown to maturity. Over 2 percent (1106) were selected for further testing in 1965. P. I. table 5 also lists the number of seedlings segregating for

resistance to each of 11 different diseases. The 1,106 seedling varieties will be grown in 10-hill rows in 1965 for further horticultural selection.

Approximately 324 selections from the breeding program were tested for resistance to eight potato diseases. Forty-four advanced selections were increased as much as possible. An additional 180 seedlings were grown in 50-hill rows, and 56 seedlings were maintained in 20-hill rows as parents.

Over 640 seedlings were maintained in 3-hill rows as part of the spindle tuber resistance study. In 1960, a test to obtain potato seedlings resistant to the spindle tuber virus was initiated in cooperation with the Department of Plant Pathology of the University of Maine. During 4 years of testing, over 15 selections have been found with moderate to good resistance to the spindle tuber virus. A number of these resistant seedlings are being used as parental material in the breeding program.

P. I. table 5. Single-hill seedlings grown on Chapman Farm in 1964, showing the total number planted, grown, and selected, and the number of selections segregating for each of 11 diseases.

Planted	Grown	Selected	Late Blight	Scab	Ring rot	Viruses			Leaf- roll	Vert. wilt	Gold. nem.	Corky ring- spot	Net Necrosis
						A	X	Y					
50,926	48,149	1,106	939	612	134	749	644	582	125	490	70	24	63

Aroostook Farm, Presque Isle, Maine

About 70 named varieties and 75 seedling selections were increased in 1964 for quality tests and distribution to potato breeding cooperators. Reliance, Norgold, Russet and Viking were a few of the new varieties increased. In addition, 332 selections were grown for observation and distribution, and for parents in the breeding plot, and 111 commercial varieties were grown in 20-hill rows in the variety collection.

The Campbell Soup, Northeast Cooperative, midseason, and Maine Cooperative yield trials were planted on May 6. The early and late maturing yield trials, the fertility test, and greening yield trial were planted on May 12. The remaining tests, except the net necrosis and verticillium wilt tests, were planted between May 13 and 16. The net necrosis and verticillium wilt tests were planted on May 22 and 27, respectively.

Twelve-hundred pounds of 10-15-15 fertilizer were applied to all plots at the time of planting. Alternate weekly sprays of dithane, and dithane plus thiodan, were applied to all plots from the last week in June to the last week in August. All plots on Aroostook Farm were sprayed with sodium arsenite on September 8. The vines of the yield trials were killed on September 14 with a rotobator. All yield trials were harvested on September 16, except the Maine Cooperative trial which was harvested on September 17. The Chapman plots were harvested between September 10 and 15; and the small plots on Aroostook Farm were harvested between September 18 and 21.

Yield Tests and Quality Studies

Three varietal tests, based on maturity, were grown on Aroostook Farm in 1964. The selections in these tests were planted in 5 replications of 20 hills each. Data was obtained on yields, percentage of U. S. No. 1 tubers, specific gravity, and potato chip color. Specific gravity determinations were made using the weight in air, weight in water method. The tubers used for the chipping test were stored in a common potato storage from the time of harvest until the first week in November. On November 11, the tubers were chipped after a conditioning period of 14 days at 70° F. The methods used to prepare and fry the potato chips are given on page 6 of the National Potato Breeding Report for 1960.

The data for the early-maturity yield trial is given in P.I. table 6. Nine seedling selections were compared with the check varieties, Katahdin, Irish Cobbler, and Cherokee, in 4 major characteristics. The L.S.D. for yield at the 5 percent level was 50 cwt. With this as the criterion of significance, none of the entries in the trial yielded more than the Cherokee or less than Irish Cobbler. Seedling B4494-6 had the highest yield (496 cwt) and seedling B4093-11 the lowest yield (371 cwt). Specific gravity of the entries in the test ranged from a low of 1.069 for seedling B5301-7 to a high of 1.086 for the check variety Irish Cobbler. B4494-6, B5267-2, and Cherokee are all in the same specific gravity class as Irish Cobbler. None of the 12 entries produced potato chips of a commercially acceptable color.

P. I. table 6. Early-maturity yield test, Aroostook Farm, Presque Isle, Maine, 1964.

Variety	Yield of		<u>1/</u>
	U. S. No. 1		Specific Gravity
	Tubers Per Acre		
	Cwt.	Pct.	
B4494-6	496	97	83
B5288-7	488	94	73
Cherokee	485	97	84
B5285-5	477	98	73
B5281-1	470	94	74
B5267-2	469	97	83
B5301-7	461	97	69
B5236-5	459	95	74
Katahdin	451	97	79
B5304-17	428	96	77
Irish Cobbler	413	93	86
B4093-11	371	95	70
L.S.D. 5%	50		04

1/ Based on the average of 20-tuber samples from three replications. 1.0 omitted from all ratings.

In P. I. table 7, 26 midseason-maturing seedling selections, and the variety Pioneer, are compared in yield, specific gravity, and chip color with the check varieties Chippewa, Kennebec, and Katahdin. The first 10 varieties in table 7 are all in the same yield class as Kennebec. If Chippewa is taken as the check, 17 varieties were higher in yield and the others were in the same class as Chippewa. The highest yielding entry was B4784-1 with 590 cwt per acre, and the lowest yielding entry

was B3428-20 with 363 cwt per acre. Five selections had less than 95 percent of U. S. No. 1 tubers. The lowest percentage was 91 percent for B5307-10. With an L.S.D. of .06 for specific gravity, B3478-58 was significantly higher than Kennebec, and 17 other seedlings are all in the same class as Kennebec. Two selections, B5131-2 and B5260-7, were the highest in specific gravity (1.085), but were very low in yielding ability. None of the entries produced potato chips with a commercially acceptable light color.

P. I. table 7. Midseason yield test, Aroostook Farm, Presque Isle, Maine, 1964.

Variety	Yield of U.S. No. 1		1/ Specific Gravity	Variety	Yield of U.S. No. 1		1/ Specific Gravity
	Tubers	Per Acre			Tubers	Per Acre	
	Cwt.	Pct.			Cwt.	Pct.	
B4784-1	590	96	1.072	B4134-26	461	95	1.072
B5288-10	566	98	64	B5307-10	458	91	69
B5280-14	561	95	77	B4093-2	453	96	82
Kennebec	550	98	80	B5236-8	447	96	75
B5287-5	549	97	72	B3478-58	444	93	92
B5304-42	519	98	82	B5031-7	434	96	80
B5304-29	504	97	84	B3331-7	426	95	78
B4119-1	496	97	72	B5131-2	425	95	85
B5288-5	489	96	64	B4987-16	406	95	73
B4808-19	488	98	73	B5147-12	399	92	72
Katahdin	482	97	78	Chippewa	391	96	66
Pioneer	481	95	79	B5260-7	388	97	85
B5304-20	476	97	79	B4744-23	374	95	80
B5253-31	470	96	74	B5240-26	365	93	76
B3429-23	470	95	79	B3428-20	363	93	76
			LSD 5%		65		06

1/ See footnote 1, P. I. table 6.

Twenty-six late-maturing selections were compared in yielding ability, specific gravity and chip color with the check varieties Green Mountain, Saco, and Katahdin. With an L.S.D. of 41 cwt the first 7 varieties in P. I. table 8 are significantly higher in yield than Katahdin but only one, B5288-22, was higher in yield than Saco. Only 3 of the 26 varieties were significantly lower in yield than Katahdin. In specific gravity class comparisons with an L.S.D. of .004 seven varieties were significantly higher than Katahdin, six were significantly lower, and 13 were in the same class. If Saco is taken as the check, B5042-2 is higher; Green Mountain, B5141-1, B4987-34, and B5234-2 are in the same class as Saco. Seedling B5015-14 had the lowest rating in percentage of U. S. No. 1 tubers (83 percent). Seedling B5042-2 had the highest specific gravity rating (1.095), the lightest potato chip color (6.3), and was in the same yield class as Katahdin.

P. I. table 8. Late-maturity yield test, Aroostook Farm, Presque Isle, Maine, 1964.

Yield of			1/	Yield of			1/
	U.S. No. 1		Specific		U.S. No. 1		Specific
Variety	Tubers	Per Acre	Gravity	Variety	Tubers	Per Acre	Gravity
	Cwt.	Pct.			Cwt.	Pct.	
B5288-22	525	98	64	B5251-13	423	97	71
B5288-60	514	98	67	B5141-1	414	98	86
Saco	477	98	90	B5245-3	407	97	69
B5241-7	464	96	75	Katahdin	412	95	79
B5234-11	465	99	80	B5282-13	403	93	82
Green Mt.	461	96	86	B5286-24	398	95	77
B5287-10	455	96	76	B5042-2	394	95	95
B5286-20	452	96	85	B4987-34	376	95	86
B5016-2	463	95	82	B5234-4	372	89	76
B5287-36	448	99	78	B5304-16	372	94	77
B5287-16	443	98	69	B5015-14	372	83	73
B5280-6	438	90	82	B5234-2	360	90	87
B5236-21	438	95	70	B5287-45	358	97	74
B5288-43	435	94	67	B5129-7	336	98	79
B5299-39	427	97	82	LSD	41		04

1/ See footnote 1, P. I. table 6.

Seedling Reaction to Net Necrosis and Stem-end Browning

The results of the net necrosis test for 1964 are given in P. I. table 9. The seedlings and varieties tested for net necrosis and showing no symptoms of internal discoloration are listed in P. I. table 9 A. A minimum of 5 viruliferous aphids were placed in the crown of each plant on July 24. On July 31, the plot was sprayed with the insecticide thiodan to prevent the spread of the viruliferous aphids to other experimental plots. The amount of infection in the test, as measured by the percentage of net necrosis symptoms in the two check varieties Green Mountain and Mohawk, was about the same in 1964 as in 1963. In 1963, 39.3 percent of the tubers of Green Mountain showed symptoms of net necrosis. Symptoms of net necrosis were observed in 33.6 percent of the tubers of the same variety in 1964. The percentage of infected tubers for the variety Mohawk for 1963 and 1964 was 26.7 and 30.2 percent, respectively. Tubers of 22 of the 53 selections tested expressed symptoms of net necrosis or stem-end browning.

P. I. table 9. Symptom expression of net necrosis and stem-end browning in susceptible and check varieties tested in the field on Aroostook Farm, Presque Isle, Maine, 1964.

Selection or Variety	Tubers Examined	Net Necrosis	Stem-end Browning	Selection or Variety	Tubers Examined	Net Necrosis	Stem-end Browning
	No.	No.	No.		No.	No.	No.
Green Mountain	253	33.6	0	B4987-34	51	11.8	0
Mohawk	193	30.2	0	B5006-6	54	14.8	0
Kennebec	238	0	2.1	B5015-14	49	0	8.2
Katahdin	265	0	1.1	B5016-2	65	0	23.1
B4784-1	60	0	5.0	B5036-40	33	0	6.1
B4809-7	64	0	4.7	B5052-7	52	0	3.8
B4828-4	27	0	11.1	B5066-3	52	0	3.8
B4987-16	65	7.7	0	B5088-7	56	3.6	0

continued

P. I. table 9, continued

B5129-7	34	0	14.7	B5280-6	75	13.3	0
B5234-11	45	33.3	0	B5287-45	33	0	15.1
B5240-26	71	5.6	0	B5299-39	38	0	13.1
B5253-31	73	0	5.5	B5301-7	42	0	4.8
B5267-2	65	0	3.1	B5304-29	53	0	3.8

P. I. table 9A. List of seedlings tested and showing no symptoms of internal discoloration.

B4744-23	B5000-18	B5063-3	B5236-8
B4808-3	B5006-15	B5089-17	B5236-21
B4808-19	B5011-17	B5090-11	B5282-13
B4829-7	B5030-10	B5131-2	B5287-5
B4845-4	B5031-7	B5132-3	B5287-10
B4846-2	B5031-8	B5141-1	B5287-16
B4846-14	B5042-2	B5141-6	B5287-36
B4986-15	B5052-14	B5147-12	

Golden Nematode Resistance

The results of the 1964 golden nematode test are summarized in P. I. table 10. Resistance to the nematode was found in all 10 family lines tested. The golden nematode resistant seedling B4523-8 was one of the parents in 8 of the 10 family lines in the test. The procedure for evaluating the resistance to golden nematode was the same as used in previous years. Testing for golden nematode resistance is a cooperative program with the Cornell Agricultural Experiment Station.

P. I. table 10. Golden nematode tests. Selections made in Maine, 1963, and tested on Long Island, New York, 1964.^{1/}

Pedigree Number	Parentage	Maine, 1963 Selected	Tested New York, 1964	
		No.	Susceptible	Resistant
B5592	B3725-1 x B4075-1	7	4	3
B5661	B4499-6 x B2067-52	1	0	1
B5677	B936-12 x B4523-8	1	0	1
B5696	B4523-8 x Katahdin	11	7	4
B5698	B4523-8 x B2067-52	12	8	4
B5699	B4523-8 x B3139-24	5	4	1
B5700	B4523-8 x B3692-4	5	2	3
B5701	B4523-8 x B3697-13	25	18	7
B5702	B4523-8 x B4488-3	10	7	3
P5716	Ac26120 x B4523-8	5	2	3
Totals		82	52	30

^{1/} Tests were made by L. C. Peterson and coworkers on Long Island, New York.

Verticillium Wilt Resistance

The results of the 1964 verticillium wilt test are summarized in P. I. table 11. Over 260 seedlings and 56 named varieties, or parental selections, were tested in the field in 1964 for wilt resistance. For the past four years, tubers used for the wilt test have been cut, dipped in a slurry of the wilt organism, and then immediately planted. Also, the land on which the test is planted is heavily infested with the wilt organism. The uniformity of infection, as compared to previous years, has been greatly increased by dipping the seed before planting.

P. I. table 11. Reaction to verticillium wilt of seedlings, parental selections, introductions, named varieties, and check varieties grown in wilt-infested soil, Aroostook Farm, 1964.

Test Material	5-Hill Units			Individual Hills		
	Tested		Infected	Total	Infected	
	No.	No.	Pct.	No.	No.	Pct.
Seedlings	268	262	98	1336	1226	92
Parents and Introductions	56	53	95	280	247	88
Checks: Houma	13	13	100	65	40	61
Katahdin	13	13	100	65	59	91
Cherokee	13	13	100	63	63	100

Scab Resistance

The data for the 1964 test are summarized in P. I. table 12. About 320 seedling selections were tested for resistance to the common race of scab. The tubers of ten of the selections were entirely free of scab symptoms. The most common percentage of tuber area covered by scab lesions was from 1 to 20 percent. Large rough pustules (type 3) was the most common pustule type observed. Most of the tubers of the check variety Green Mountain had from 41 to 60 percent of their surface area covered with large rough and deeply pitted pustules.

P. I. table 12. Summary of the data observed from the scab test on Aroostook Farm, Presque Isle, Maine, 1964.

	2-Hill Units	Scab Free	1/ Surface Area Covered						2/ Pustule Type			
			T	1	2	3	4		1	2	3	4
Seedling Selections	320	10	24	170	83	29	4		36	50	140	84
Green Mountain Checks	320	0	0	0	0	320	0		0	0	0	320

1/ Surface area covered: T, less than 1%; 1, 1 to 20%; 2, 21 to 40%; 3, 41 to 60%; 4, 61 to 80%.

2/ Type of pustule: 1, small superficial; 2, large, but still superficial; 3, large, rough pustules; 4, large, rough pustules deeply pitted.

Potato Tuber Greening

The greening intensities of tubers measured in 1964 were conducted in a similar manner as those reported in the 1963 National Potato-Breeding Program report on page 13.

The greening classes for 434 varieties and seedling selections are presented in P. I. table 13. Seedlings B4829-7 and B5000-18 and Keswick in the Campbell Soup yield test were judged as Class 1. In the early-maturity yield test seedlings B4093-11, B5281-1, B5284-5, and B5301-7 showed no visible greening (Class 1) while Katahdin and Irish Cobbler were placed in Class 4. Seedling B5236-8 in the medium-maturity yield test was the only entry showing no greening and in the late-maturity yield test B5326-21, B5287-36, and B5287-45 showed a similar reaction. Seedling B4523-8 in the Eastern Regional Trial grown in Maine showed no greening.

Antigo, Huron, Keswick, and Viking, from the variety collection, were classified as in Class 1. Also, 10 selections out of 206 in the advance and increase seedling groups were found to be non-greening as in greening Class 1 in 1964.

P. I. table 13. Evaluation of tuber greening intensity^{1/} in varieties and advance selections grown at Presque Isle, Maine, and exposed to light at Beltsville, Maryland, 1964.

Source of Material	Tuber Greening Classes ^{2/}					Number of Selections
	1	2	3	4	5	
Campbell yield test	3	4	13	8	2	30
Early variety yield test	4	3	2	3		12
Medium " " "	1	8	14	7		30
Late " " "	3	6	15	4	1	29
Eastern Regional Yield Trials	1	5	6	2		14
Variety Collection	4	24	42	38	5	113
Advance Seedlings	5	39	70	54	12	180
Seedlings for Increase	5	7	12	1	1	26
Totals	26	96	174	117	21	434

^{1/} Exposed 100 hours at 35 foot-candles of incident light.

^{2/} Greening classes: 1, none; 2, trace; 3, slight; 4, moderate; 5, intense.

Advance Seedling Selections

From approximately 80,000 seedlings grown in 1961 and 1962 on the Chapman Farm, Presque Isle, Maine, the 17 seedlings shown in P. I. table 14 have survived and are being increased in 1965 for field tests and further evaluation for various processed products. Their general characteristics based on their performance in 1963 are also presented.

P. I. table 14. Advance potato selections evaluated in 1963 and increased in 1964, Presque Isle, Maine.

9/ Pedigree Number	Parentage	Field 1/ Fert.	Maturity 2/	Sp. Color	Specific Gravity	Yield No. 1	Green 3/ Class	Late 4/ Blight	5/ Scab	Vert Wilt 6/ Leafroll 6/	Virus X Af	7/ Tests Ag Yf	8/ Silver Scurf
		Class			Ratio	Cwt/A	No.	G	A T				
B4744-23	B2969-15xND457-1	0	ME	Sl.net	1,079	328	1	R ₁	2	0	5	S	2
B4808-3	B922-3xB3391-2	3	M	Red	71	353	3	R ₁	6	0	4	R	4
B4829-7	B3139-24xB3478-45	1	M	Wh	58	342	1	R ₁	3	4	5	S	4
B4986-15	47156xB2834-3	4	L	Yel.	82	268	2	r	6	3	3	R	S
B5000-18	B3114-6xB3478-45	3	L	Wh	74	329	1	R ₁	4	5	5	S	3
B5011-17	B3556-12 xA180-26	2	L	Wh	83	395	2	r	6	4	5	S	1
B5031-18	B4116-1xB4154-2	3	M	Wh	84	269	3	r	6	2	4	R	4
B5036-40	B4159-8xKatahdin	2	M	Wh	81	404	3	R ₁ R ₃	2	2	5	S	2
B5052-7	Boone x B3692-4	2	L	Wh	69	314	3	R ₁ R ₃	1	2	4	S	3
-14	"	2	L	Wh	71	393	1	R ₁ R ₄	4	4	5	S	4
B5063-3	Houma x Redskin	1	ML	Red	80	330	2	r	6	1	2	R	4
B5066-3	Kennebec x Merrimack	2	ME	Wh	72	404	3	R ₁ R ₃	2	2	5	S	3
B5088-7	B605-10xB3692-4	1	ME	Wh	69	374	4	R ₁	1	2	3	R	2
B5089-17	B606-3xB3692-4	2	L	Wh	85	376	3	R ₁ R ₂ R ₃	2	4	5	S	3
B5090-11	B607-56xMerrimack	3	M	Wh	74	363	2	R ₁ R ₃	1	3	4	S	3
B5132-3	B606-37xB606-3	1	ME	Sl.net	71	376	3	r	6	1	3	S	3
B5141-6	47156xB3672-3	4	M	Wh	104	283	5	R ₁ R ₃	2	3	4	R	2

1/ Field fertility: 1, none; 2, slight; 3, medium; 4, high.

2/ Maturity: E, early, M, medium; L, late; LL, very late.

3/ Greening classes of selections exposed to 37 ft. candles of combination daylight and fluorescent light for 100 hours. 1, no visible greening; 2, slight; 3, medium; 4, intense; 5, very intense.

4/ G=major genotypes. F=field test. 1 to 6=no symptoms to dead vines.

5/ A=surface area covered. T=less than 1%, 1=1 to 20%, 2=21 to 40%, 3=41 to 60%, 4=61 to 80%. T=pustule type. 1=small and superficial, 2=larger and still superficial, 3=large and rough, 4=large, rough, and pitted. Check variety had a 3-4 rating.

6/ Field exposure test. Viruliferous green peach aphids used as source of infection on 5 plants per selection in leafroll test. Five seed pieces were dipped into a slurry of verticillium wilt and planted immediately in infested soil. 0 indicates no symptoms to all 5 infected.

7/ X resistance determined by mechanical inoculation with a virulent strain of virus X and checking on Gomphrena globosa. A indicates field resistance for virus A and Ag is graft resistance. Virus Y resistance is based on field resistance to aphid inoculation.

8/ Silver scurf rating 1, heavy to 5, scant. Observations made in field test grown in North Dakota.

9/ In addition, B4829-7 and B5000-18 possess resistance to ring rot, B5036-40 is resistant to golden nematode, B5031-18 and B5132-3 are resistant to corky ringspot, B5052-7 has high field resistance to early blight and leafhopper burn, and B5141-6 is low in sugar content.

Potato Disease Investigations

W. P. Raymer, Muriel J. O'Brien, E. S. Schultz,
A. L. Schark, R. V. Akeley, R. W. Buck, Jr.

Late Blight Resistance

Data on the major gene content of the selections tested in 1963 are given in P. I. table 15. This information was obtained from tests with detached leaves from greenhouse-grown plants during January and February of 1964.

P.I. table 15. Genotype of selections tested for late blight resistance in 1963.

Genotype	Number of Selections	Genotype	Number of Selections
R ₀	180	R ₂ R ₃	2
R ₁	83	R ₂ R ₄	1
R ₂	5	R ₃ R ₄	2
R ₃	4	R ₁ R ₂ R ₃	7
R ₄	2	R ₁ R ₂ R ₄	0
R ₁ R ₂	5	R ₁ R ₃ R ₄	0
R ₁ R ₃	20	R ₂ R ₃ R ₄	1
R ₁ R ₄	7	R ₁ R ₂ R ₃ R ₄	0

In 1964, 324 advanced selections and varieties were tested for blight resistance in the field at Presque Isle. An additional 57 clones with potential field resistance were also tested. Race 1,4 of late blight obtained from a cull pile in the area was used as inoculum. Race 1,4 has been the common race in the area for the past few seasons. Approximately 70 of the 324 advanced selections remained free of blight through the entire season and 51 of the 57 field-resistant clones also remained free of blight. Infection of the 6 clones in the field-resistant group occurred late in the season and only a trace to 15 percent of the foliage was affected. After the first of September, races 2,4 and 1,2,4 also developed in the field.

Genotypes of the 324 advanced selections were determined from detached leaf tests in the greenhouse during January and February 1965. Results of these tests are summarized in table 16.

P.I. table 16. Genotypes of selections tested for resistance to late blight in 1964.

Genotype	Number of Selections	Genotype	Number of Selections
R ₀	143	R ₂ R ₃	4
R ₁	51	R ₂ R ₄	1
R ₂	1	R ₃ R ₄	8
R ₃	17	R ₁ R ₂ R ₃	5
R ₄	15	R ₁ R ₂ R ₄	4
R ₁ R ₂	3	R ₁ R ₃ R ₄	11
R ₁ R ₃	22	R ₂ R ₃ R ₄	2
R ₁ R ₄	23	R ₁ R ₂ R ₃ R ₄	5

Genes R₂ and R₃ provided protection for the 70 clones resistant in the field test.

Virus A Resistance

No foliage symptoms of virus A were visible in plants aphid-inoculated with this virus in the field in 1964. Despite multiple inoculations and abundant aphids even the highly susceptible Green Mountain variety remained symptomless in the field. All of the 324 clones tested were indexed in the greenhouse during January and February. The Solanum tuberosum x S. demissum hybrid A-6 infected with a mild strain of X was used as the index plant with excellent results. The majority of the Green Mountain check plants did show symptoms of virus A in the greenhouse. However, only 18 of the 324 selections tested were found to have been infected by means of aphids in the field. Approximately 189 selections were resistant to virus A from graft inoculation, 47 of them with the top-necrosis hypersensitive reaction. Since almost 60 percent of these selections were resistant to graft inoculation with virus A, it is not surprising that only 5-6 percent were susceptible to aphid inoculation.

Virus Y Resistance

Field resistance to aphid inoculation with virus Y was determined for the 324 advanced selections. Tubers were harvested from plants not developing symptoms in the field and plants from these tubers were indexed on tobacco. In contrast to the results in 1963 when only 13 selections were resistant, 175 of the clones tested were resistant in 1964.

Virus X Resistance

A virulent strain of virus X from Katahdin was used to sap-inoculate 324 advanced selections grown in the greenhouse at Presque Isle. Approximately 70 of these clones remained free of X as determined by sub-inoculation to Gomphrena globosa six weeks later. Tubers from each resistant clone were taken to Beltsville and the plants again tested on Gomphrena. Those plants still virus-free were then grafted with X-infected scions. Results of these tests will be available in the 1965 report.

Solanum Species and Hybrids

R. W. Buck, Jr.

Cytogenetic investigations of Solanum species and hybrids were continued at Beltsville in 1964. Several clones of 58 diploid species, 4 tetraploid species and 3 hexaploid species were grown for cytological and crossability studies. F₁ hybrid seed was obtained from 108 different interspecific pollinations among the diploid species. Seed was obtained from 3 matings among tetraploid and diploid species.

Progenies of 78 diploid interspecific hybrids were grown for cytological studies. The majority of these interspecific hybrids showed normal chromosome behavior during meiosis in the pollen mother cells.

F₂ seed was obtained from sib-matings in 48 of the diploid hybrid progenies. When used as females, 45 of the diploid hybrid progenies were successfully backcrossed to the female parent species, and 52 were successfully backcrossed to the male parent species.

Inter-Regional Potato Introduction Project (IR-1)

P. R. Rowe and R. W. Ross

One hundred forty-one new stocks were received in 1964 from 11 countries (Argentina, Bolivia, Columbia, Ecuador, Germany, Japan, Mexico, Netherlands, Peru, Sweden, USSR). Eighty-three introductions were provided by Mr. Don Ugent of the NSF sponsored Solanum expedition to Mexico and South America.

Because maintenance of Solanum stocks as true seed is more reliable and economical than clonal propagation, continued efforts were made to obtain a true seed increase of all recent introductions. Foreign and American varieties and breeding stocks in the collection were crossed with the variety Katahdin as an added protective measure to preserve this germ-plasm. Many introductions eventually will be available only in the form of true seed. This will provide a more reliable sample of the potential of a species than an arbitrarily selected clone. Seed of 202 introductions was sent to the National Seed Storage Laboratory, Fort Collins, Colorado.

Shipments of 693 seed and 885 tuber samples were made during 1964 to 18 states and 8 countries. The second "Inventory of tuber-bearing Solanum species" has been completed and will be distributed early in 1965.

One hundred sixteen new herbarium specimens of 20 species and 26 interspecific hybrids were made in 1964. The IR-1 herbarium has been loaned to Mr. Don Ugent of the Department of Botany, University of Wisconsin, for use in his Ph.D. study.

The major objective of the Potato Introduction Program is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily available reservoir of useful breeding stocks. Accomplishment of this objective must be measured largely by the success with which new, improved varieties meet the needs of commercial production. Ninety-six of the 112 modern American Potato varieties developed and released during the past 30 years through the combined efforts of private, state, and federal breeders have 2 or more foreign introductions in their pedigree. These varieties comprised approximately 68% of the total seed potato production for 1964 in the United States.

The collection also is being continually evaluated for potentially valuable characters and for means of transferring these characters to the cultivated potato. Sixteen research papers reporting the use of IR-1 stocks were published in 1964.

Eastern Regional Potato Trials, 1964
R. V. Akeley, F. L. Haynes, M. E. Gallegly
W. R. Mills, and A. E. Schark

In 1964 the potato breeders of eastern areas of the United States continued their comparative yield trials in four States--Maine, West Virginia, Pennsylvania, and North Carolina. The test in North Carolina is not included in this report because of water damage.

Environmental Conditions: Tests were grown in Maine on Caribou loam soils and in West Virginia on clay loam. Late blight was not a problem in any of the three tests. In Maine the season was favorable for potato yields as shown by the mean yield of 392 cwt per acre for the 14 varieties tested. In Pennsylvania following a wet April, the three months that followed were extremely dry with a rainfall of .55 inches for May, 2.44 for June, and 1.49 inches for July. About 5.5 inches of water were applied by overhead irrigation in June and July. In West Virginia the temperature and rainfall generally were favorable for good growth and yields.

Planting and harvesting dates, row and seed spacing and fertilizer rates and ratios for each State are found in the following tabulation:

State	Date Planted	Date Harvested	Row Spacing	Seed Spacing	Fertilizer Per Acre
Maine	May 6	Sept. 16	34 in.	10 in.	1200 (10-15-15)
Pennsylvania	May 12	Sept. 15	34 in.	12 in.	1600 (5-10-5)
West Virginia	May 7	Oct. 15	36 in.	10 in.	1500 (5-10-10)

Results: The mean yields were relatively high for all 3 tests (Northeastern table 1). The average for the varieties in the Maine test was 392 cwt per acre, for Pennsylvania 295, and for West Virginia 286. The variability in each test was rather large. The L.S.D's at the 5 percent level were about 16 percent of the mean for Maine, 19 percent for Pennsylvania, and 35 percent for the West Virginia test. Kennebec was first in rank in the Maine test but if the L.S.D. at the 5 percent level of 64 cwt is considered, seven other varieties were in the same class as Kennebec. In Pennsylvania 56C-18-10 was significantly higher in yield than Kennebec and seven others were in the same class. In West Virginia 56C-18-10 outyielded Kennebec again but because of the high L.S.D. of 99 cwt Kennebec did not significantly outyield any of the other 12 varieties.

The L.S.D. at the 5 percent level for the means was 66 cwt per acre. This was calculated from the mean yields of the 14 varieties in the three tests and is derived from the interaction between varieties and places.

With 66 cwt per acre as a measure of significance none of the varieties outyielded Kennebec and only three, B4473-3, WV34-22, and WV35-88 were lower than the check.

Seedling 56C-18-10 yielded almost the same in all three tests. All others showed much greater differences. Varieties such as 56C-18-10 would be desirable in the region so far as yield is concerned.

In 1964 total solids and maturity classes were reported from Maine and Pennsylvania and tuber appearance from Maine and West Virginia. The data as reported for these characters are found in Northeastern table 2.

Northeastern table 1. Yield and percentage of U. S. No. 1 tubers per acre in three States, 1963.

Variety or Selection	L O C A T I O N S							
	Maine		Pennsylvania		West Virginia		Means	
	Cwt.	Pct.	Cwt.	Pct.	Cwt.	Pct.	Cwt.	Pct.
56C-18-10	403	93	399	90	398	87	400	90
Ona	422	95	343	91	358	90	374	92
Kennebec	461	98	340	95	273	60	358	84
Pennchip	382	95	327	92	337	76	349	88
IL57410-2	428	93	306	86	314	76	349	85
50B33-3	407	96	303	93	353	88	354	92
IL333-WV2	443	95	282	86	301	86	342	89
Katahdin	414	97	326	93	282	88	341	93
B4523-8	441	97	338	92	212	53	330	81
54W14-1	375	96	322	93	283	84	327	91
Irish Cobbler	388	96	280	91	244	79	304	89
B4473-3	380	91	246	80	216	51	281	74
WV34-22	257	81	215	77	213	82	228	80
WV35-88	291	84	108	65	220	87	206	79
Mean	392		295		286			
LSD 5%	64		57		99		66	

Northeastern table 2. Total solids, maturity and tuber appearance as reported.

Variety	1/ Percentage Total Solids			2/ Maturity Classes			Tuber 3/ Appearance		
	Maine	Penna.	Mean	Maine	Penna.	Mean	Maine	W. Va.	Mean
56C-18-10	17.7	17.6	17.7	2	3	2.5	3	4	3.5
Ona	19.7	20.0	19.9	4	5	4.5	4	5	4.5
Kennebec	20.3	19.2	19.8	4	4	4.0	3	3	3.0
Pennchip	19.4	18.4	18.9	4	4	4.0	2	3	2.5
IL57410-2	19.0	18.6	18.8	4	2	4.1	2	3	2.5
50B33-3	19.7	18.9	19.3	4	1	2.5	2	4	3.0
IL333-WV2	19.0	18.2	18.6	4	3	3.5	3	4	3.5
Katahdin	19.0	20.1	19.6	4	4	4.0	3	5	4.0
B4523-8	18.0	17.6	17.8	3	4	3.5	3	2	2.5
54W14-1	22.0	21.6	21.8	4	4	4.0	2	3	2.5
Irish Cobbler	20.5	18.8	19.7	3	1	2.0	2	3	2.5
B4473-3	21.6	19.4	20.5	4	3	3.5	3	2	2.5
WV34-22	18.4	21.2	19.8	4	4	4.0	3	4	3.5
WV35-88	19.2	19.7	19.5	4	2	3.0	3	4	3.5
LSD 5%	.8								

1/ From table of M. Maercker-Landwerths Band 25, 1880, pg. 107

2/ Maturity: 1=very early, 2=early, 3=medium, 4=late, 5=very late

3/ Appearance: 1=poor, to 5=excellent

NORTH CENTRAL REGIONAL TRIALS, 1964
R. H. Johansen and Cooperators 1/

Nineteen sixty-four marked the fourteenth year that the North Central Regional trials have been conducted. During this past season eleven states in the north central region, the USDA in Louisiana and Maine, and Louisiana State University participated in these trials. Trial data was reported from twelve states during 1964.

Because of the relatively large number of states involved, these trials have been highly beneficial in testing and evaluating advanced selections over a wide range of environmental conditions. The North Central trials have also been beneficial in that it points out the weakness and the strong points of certain advanced selections, and that it gives the cooperator and his co-workers an opportunity to become familiar with certain advanced selections long before they are released and named as varieties.

From the 1964 trials one selection has been named and released as follows:

<u>Progeny No.</u>	<u>Released Name</u>	<u>Introduced By</u>	<u>Parents</u>
ND 4192-3	Norgold Russet	North Dakota	A119-1 x ND 2475-8

Environmental Conditions: These trials were conducted on peat soils in Indiana and Iowa, and on mineral soils at the other locations. Mineral soils ranged from clay loam to very fine sandy loam. Culture practices (fertilizer application, irrigation, spray programs, vine killing, planting distance) are based on local conditions.

Planting and harvest dates are listed below:

<u>State</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Total days to harvest</u>
Indiana	May 14	October 21	161
Iowa	May 4	September 21	141
Kansas	March 23	July 29	129
Louisiana	February 4	May 25	112
Michigan	May 18	September 24	192
Minnesota	June 8	September 29	113
Missouri	March 16	August 1	136
Nebraska	June 18	October 1	104
North Dakota	May 4	September 21	140
Ohio	May 22	October 9	140
South Dakota	May 29	October 29	153
Wisconsin	April 29	September 23	148

1/ Indiana, J. Bowers; Iowa, J. Weigle; Kansas, J. Greig; Louisiana, J. Miller, J. Fontenot; Michigan, N. Thompson; Minnesota, O. Turnquist; Missouri, V. Lambeth; Nebraska, R. O'Keefe; North Dakota, R. Johansen; Ohio, G. Marlowe; South Dakota, L. Carlson; Wisconsin, J. Schoenneman, D. Kichefski, S. Peloquin; USDA, R. Akeley, A. Schark, T. Dykstra.

Rainfall and temperatures were quite variable during the 1964 season. Normal or above normal precipitation was received in North Dakota, South Dakota, Minnesota, Iowa and Louisiana, while below normal precipitation was received in Michigan, Wisconsin, Nebraska, Indiana and Ohio. Several of the states had favorable to good growing conditions for potatoes. High temperatures during July were experienced throughout most of the northern states followed by an early killing frost. The poor distribution of precipitation and extremely high temperatures during some part of the season and the early frost were considered to be the greatest weather hazard affecting the 1964 North Central Regional trials.

Entries: Entries for the 1964 trial were received from Iowa, Nebraska, Louisiana, North Dakota, Wisconsin, USDA Maine and USDA Louisiana. North Dakota furnished seed of the check varieties Norland, Red Pontiac and Irish Cobbler. For the first time in several years all entries were sent to all cooperators in 1964. Because of misplaced seed, I 57410 and Wisc 563 were not planted in Indiana.

Yields: (Early to medium) Neb 412.55-2 was the highest yielding entry in this group. ND 4192-3 produced a higher average yield than Norland but slightly lower than Irish Cobbler. For the most part very little differences in yield were noted for the entries in the early to medium early group. Yields averaged from 241 to 206 hundredweight per acre, a difference of only 35 hundredweight per acre.

Yields: (Medium late to late) Red Pontiac again produced the highest average yield in both the late and early maturity groups. It is interesting to note that Red Pontiac has consistently produced the highest average yield since the trials were first established in 1950. Of the advanced numbered selections, TL 7935 and La 12-4 produced the highest average yield. Both of these selections have the potential to produce a high marketable yield.

Maturity: All states except Iowa, Minnesota and Nebraska reported maturity ratings. Unusually early frost prevented the cooperators from taking readings in these states. No entries were earlier than the check varieties, Norland and Irish Cobbler, and all entries were earlier than the check variety, Red Pontiac. Neb 412.55-2 appeared to be later in maturity than reported.

Total Solids: Wisc 563 produced the highest percent total solids, and was the only selection grown in trial that exceeded the check variety, Irish Cobbler. All entries exceeded the check varieties, Norland and Red Pontiac. Highest total solids were again recorded in North Dakota and Ohio.

Scab Reaction: Michigan and Missouri reported no scab while Louisiana reported only light to moderate amounts. Indiana and Nebraska reported the highest incidence of scab. ND 4192-3 for the third consecutive year was found to have the lowest amount of scab. Several advanced selections showed some degree of resistance to scab while others were found to be highly susceptible.

Internal and External Defects: Characters with possible weakness are starred only to call it to the attention of the person responsible for this selection. Some of these weaknesses are more or less associated with the growing conditions found under the different environmental conditions. For example, at all locations

in 1964, ND 4524-7R was found to be quite susceptible to internal and vascular discoloration, while B 4523-8 was found to be highly susceptible to second growth. Hollow heart could be a problem for TL 7627 and TL 7935. Several selections appeared to be quite susceptible to scab.

Overall Merit Ratings--merit ratings are presented for the 1964, 1963 and 1962 seasons for possible comparisons.

<u>Rating</u>	<u>1964</u>	<u>1963</u>	<u>1962</u>
1. ND 4192-3	26	35	27
I 57410	26	18	*
2. La 12-4	25	*	*
Neb 4.56-9	25	14	*
3. TL 7935	15	10	*
4. Wisc 563	9	*	*
TL 7627	9	6	*
WY 1122	9	*	*
5. Neb 412.55-2	7	*	*
ND 4524-7R	7	14	22
Neb 302.50-5	7	*	*

* Not entered in 1962 and 1963

North Central table 1. Yields of U. S. No. 1

	Ind. Cwt.	Iowa Cwt.	Kans. Cwt.	La. Cwt.	Mich. Cwt.	Minn. Cwt.	Mo. Cwt.	Nebr. Cwt.	N.D. Cwt.	Ohio Cwt.	S.D. Cwt.	Wisc. Cwt.	Ave. Cwt.	Yield Rank
<u>Early</u>														
Neb 412.55-2	489	249	112	146	179	372	169	80	117	226	201	551	241	8
ND 4192-3	305	223	75	160	136	339	239	73	130	252	207	491	219	12
Norland	370	151	135	172	146	245	238	66	121	240	159	424	206	14
Irish Cobbler	419	264	169	194	201	316	204	46	149	215	174	393	229	11
<u>Medium to late</u>														
Neb 4.56-9	414	277	174	222	176	386	228	95	131	260	242	570	265	4
Neb 302.50-5	399	229	169	185	157	370	230	68	119	241	208	431	234	9
Wisc 563		283	127	168	139	262	204	43	124	282	194	406	203	15
La 12-4	558	318	182	175	209	339	205	64	135	357	254	592	282	3
TL 7627	466	292	139	180	156	346	229	53	161	229	229	531	251	6
TL 7935	560	329	206	256	187	356	276	90	175	317	162	633	296	2
ND 4524-7R	396	221	178	204	172	302	188	62	122	312	212	606	248	7
I 57410		394	188	202	158	288	291	83	161	283	189	540	253	5
B 4523-8	383	339	177	179	146	333	196	17	168	192	150	508	232	10
WY 1122	347	250	106	165	158	297	160	17	141	252	132	486	209	13
Red Pontiac	584	425	222	246	247	376	252	88	145	332	288	755	330	1
Average	438	283	157	190	171	329	221	63	140	266	200	528	246	

North Central table 2. Maturity classification ^{1/}

	<u>Ind.</u>	<u>Iowa</u> ^{2/}	<u>Kans.</u>	<u>La.</u>	<u>Mich.</u>	<u>Minn.</u> ^{2/}	<u>Mo.</u>	<u>Nebr.</u> ^{2/}	<u>N.D.</u>	<u>Ohio</u>	<u>S.D.</u>	<u>Wisc.</u>	<u>Ave.</u>
<u>Early</u>													
Neb 412.55-2	3.0		4.2	2.0	4.0		3.4		3.0	2.0	3.0	4.5	3.2
ND 4192-3	2.0		3.2	2.0	3.0		3.1		2.0	2.0	2.0	2.0	2.4
Norland	2.0		1.0	2.0	2.0		2.0		2.0	2.0	1.0	1.5	1.7
Irish Cobbler	2.5		1.5	2.0	2.0		2.3		2.0	1.0	2.0	1.8	1.9
<u>Medium to late</u>													
Neb 4.56-9	3.5		3.5	2.0	3.0		4.0		3.0	2.0	3.0	4.0	3.1
Neb 302.50-5	3.5		3.5	3.0	3.0		3.5		3.0	3.0	3.0	2.5	3.1
Wisc 563			2.0	2.0	3.0		3.8		3.0	4.0	4.0	3.5	3.2
La 12-4	3.5		3.2	3.0	4.0		3.8		3.0	2.0	3.5	5.0	3.5
TL 7627	3.0		2.0	3.0	4.0		3.2		2.0	4.0	3.0	2.5	3.0
TL 7935	3.0		3.0	3.0	4.0		2.5		3.0	2.0	2.0	3.5	2.9
ND 4524-7R	3.0		2.2	4.0	3.0		2.8		3.0	3.0	3.0	3.5	3.1
I 57410			3.5	2.0	5.0		3.8		2.0	2.0	3.0	3.5	3.1
B 4523-8	3.5		4.5	2.0	5.0		4.3		3.0	5.0	3.0	4.0	3.8
WY 1122	3.0		2.2	3.0	4.0		3.8		2.0	5.0	4.0	4.0	3.4
Red Pontiac	4.0		4.4	3.0	5.0		4.0		4.0	5.0	4.0	5.0	4.3

^{1/} 1 = Very early; Warba maturity

2 = Early; Norland or Irish Cobbler maturity

3 = Medium; Chippewa or Cherokee maturity

4 = Late; Katahdin or Red Pontiac maturity

5 = Very late; Kennebec maturity

^{2/} Vines killed by frost before maturity readings could be taken

North Central table 3. Total solids.

	Ind. Pct.	Iowa Pct.	Kans. Pct.	La. Pct.	Mich. Pct.	Minn. Pct.	Mo. Pct.	Nebr. Pct.	N.D. Pct.	Ohio Pct.	S.D. Pct.	Wisc. Pct.	Range Pct.	Ave. Pct.
<u>Early</u>														
Neb 412.55-2	15.0	13.1	16.2	15.2	18.6	15.6	17.3	18.4	19.0	18.7	17.8	16.2	13.1-19.0	16.8
ND 4192-3	16.0	14.8	16.2	16.2	19.0	15.0	17.5	19.0	20.9	18.5	17.8	16.2	14.8-20.9	17.3
Norland	15.6	12.3	16.9	15.6	17.1	14.8	15.8	17.5	18.8	18.3	16.9	13.7	12.3-18.8	16.1
Irish Cobbler	17.6	17.3	19.0	17.5	18.8	16.7	18.2	19.4	22.0	19.6	19.3	16.2	16.2-22.0	18.5
<u>Medium to late</u>														
Neb 4.56-9	16.1	14.8	16.7	15.4	18.6	13.9	17.7	20.5	18.8	18.3	18.1	16.2	13.9-20.5	17.1
Neb 302.50-5	17.1	14.6	17.7	16.0	18.6	14.5	18.6	18.8	21.4	20.0	19.3	16.7	14.5-21.4	17.8
Wisc 563		16.5	18.6	18.4	20.7	17.1	18.8	20.5	22.7	21.5	20.5	18.8	16.5-22.7	19.5
La 12-4	16.9	14.2	15.6	15.2	17.7	14.8	17.5	17.3	19.9	19.4	19.5	16.0	14.2-19.9	17.0
TL 7627	16.9	15.8	19.0	17.3	19.7	14.3	16.7	19.0	20.5	20.2	16.5	16.2	14.3-20.5	17.7
TL 7935	15.2	14.8	16.5	15.2	16.9	14.3	16.7	18.8	18.8	18.5	17.7	16.2	14.3-18.8	16.6
ND 4524-7R	15.2	13.3	15.4	15.6	17.3	14.8	16.9	19.7	19.7	19.6	17.1	15.0	13.3-19.7	16.6
I 57410		15.2	17.3	16.0	18.2	14.8	16.7	19.2	19.9	19.8	18.4	16.0	14.8-19.9	17.4
B 4523-8	16.7	15.8	16.9	15.4	18.4	14.1	18.0	17.5	18.8	19.4	17.5	17.1	14.1-19.4	17.1
WY 1122	16.8	14.8	18.0	16.9	18.8	14.8	18.0	17.5	19.0	19.4	17.1	16.9	14.8-19.4	17.3
Red Pontiac	15.3	13.9	15.2	15.2	17.5	13.7	16.2	17.5	18.6	18.5	17.1	14.3	13.7-18.6	16.1
Average	16.2	14.7	17.0	16.1	18.4	14.9	17.4	18.7	19.9	19.3	18.0	16.1		17.3

North Central table 4. Scab reactions reported 1/

	<u>Ind.</u>	<u>Iowa</u>	<u>Kans.</u>	<u>La.</u>	<u>Mich.</u>	<u>Minn.</u>	<u>Mo.</u>	<u>Nebr.</u>	<u>N.D.</u>	<u>Ohio</u>	<u>S.D.</u>	<u>Wisc.</u>
<u>Early</u>												
Neb 412.55-2	3-2	1-2	1-1	0-0		1-1		1-3	3-2	1-2	1-2	-2
ND 4192-3	1-2	T-1	1-1	0-0		0-0		2-1	1-1	1-1	1-1	-0
Norland	3-2	T-1	1-1	0-0		1-1		1-5	1-1	1-2	2-2	-3
Irish Cobbler	3-3	1-1	3-1	2-4		1-5		1-5	3-3	2-2	2-2	-5
<u>Medium to late</u>												
Neb 4.56-9	2-2	1-2	4-2	1-1		2-3		1-2	2-2	3-2	3-1	-3
Neb 302.50-5	1-4	T-2	3-2	1-1		1-3		1-3	2-2	1-1	2-1	-3
Wisc 563		1-2	1-1	1-1		1-1		2-4	2-1	T-2	2-1	-3
La 12-4	3-2	1-3	1-1	1-1		1-4		2-5	2-1	2-2	1-1	-5
TL 7627	3-1	T-1	2-1	1-1		1-5		1-3	2-2	2-2	1-1	-4
TL 7935	2-2	1-2	2-1	T-1		1-1		1-4	2-3	2-3	1-1	-5
ND 4524-7R	4-3	1-3	1-1	1-1		1-1		1-3	2-2	1-2	1-1	-5
I 57410		1-2	3-1	T-1		1-4		1-3	1-1	1-1	1-2	-3
B 4523-8	1-2	T-3	1-1	T-1		1-3		1-3	1-1	1-1	1-1	-5
WY 1122	3-3	1-2	2-3	1-1		1-4		1-2	3-2	1-1	3-1	-2
Red Pontiac	4-2	1-2	3-1	1-1		1-4		1-4	2-3	3-3	1-1	-5

1/

<u>Area</u>	<u>Type</u>
T = less than 1%	1 = small, superficial
1 = 1-20%	2 = larger, superficial
2 = 21-40%	3 = large, rough pustules
3 = 41-60%	4 = large pustules, shallow holes
4 = 61-80%	5 = large pustules, deep holes
5 = 81-100%	

North Central table 5. Summary of grade defects (internal and external).

	Scab Pct.	Growth Cracks Pct.	Second Growth Pct.	Sun Green Pct.	Total free of Ext. Def. Pct.	Hollow Heart Pct.	Internal Necrosis Pct.	Vascular dis- coloration* Pct.	Total free of Int. Def. Pct.
<u>Early</u>									
Neb 412.55-2	26.0	4.6	5.5	1.8	63.3	4.5	1.6	14.8	80.6
ND 4192-3	15.3	2.4	4.7	4.9	74.3	4.1	2.2	5.3	89.1
Norland	25.1	3.1	1.0	2.4	68.9	1.0	3.7	4.9	90.5
Irish Cobbler	43.7	3.1	6.4	5.3	46.1	4.8	3.4	21.3	71.5
<u>Medium to late</u>									
Neb 4.56-9	28.0	1.5	3.0	6.3	63.3	2.3	0.1	12.7	85.0
Neb 302.50-5	20.1	2.0	3.7	5.3	68.8	1.8	1.5	11.8	82.5
Wisc 563	23.2	4.1	1.8	2.8	70.0	4.8	3.8	5.6	86.3
La 12-4	36.5*	1.8	1.5	2.6	57.3	0.3	0.1	9.4	90.3
TL 7627	25.6	5.7	4.1	9.5*	58.9	7.7*	5.5	5.8	81.3
TL 7935	29.9*	2.8	5.7	5.1	59.6	9.1*	2.5	12.8	76.3
ND 4524-7R	29.0*	5.9	1.8	1.8	59.5	0.9	17.7*	20.4*	59.9
I 57410	27.5	1.5	2.2	1.7	67.3	0.3	6.9	9.5	83.8
B 4523-8	21.5	5.6	23.7*	7.8	45.4	1.3	1.2	13.1	82.4
WY 1122	31.9*	10.6*	1.6	9.3*	57.8	1.5	0.8	7.6	90.1
Red Pontiac	36.8	2.4	5.1	3.3	56.4	2.2	2.0	7.3	88.8

1/ Percent normal tubers showing no defects (some individual tubers had more than one type of defect).
 * Possible weakness in variety.

North Central table 6. Merit rating ^{1/}

	<u>Ind.</u>	<u>Iowa</u>	<u>Kans.</u>	<u>La.</u>	<u>Mich.</u>	<u>Minn.</u>	<u>Mo.</u>	<u>Nebr.</u>	<u>N.D.</u>	<u>Ohio</u>	<u>S.D.</u>	<u>Wisc.</u>	<u>Total Ave.</u>
<u>Early</u>													
Neb 412.55-2		3						2		2			7
ND 4192-3	3	4				5	5	1	5			3	26
Norland						3	2						5
Irish Cobbler			2										2
<u>Medium to late</u>													
Neb 4.56-9	1		4	4	3			5			4	4	25
Neb 302.50-5	4										3		7
Wisc 563			1	1	2	2	1					2	9
La 12-4	5	1	3						1	5		5	25
TL 7627	2						4		3				9
TL 7935		2	5	5				3					15
ND 4524-7R					4					3			7
I 57410		5		3	1	4	3	4	4	1	1		26
B 4523-8									2				2
WY 1122				2	5	1						1	9
Red Pontiac										4			4

1/ Merit points determined as follows:

Merit Rating	Merit Points
1	5
2	4
3	3
4	2
5	1

PACIFIC NORTHWEST

Aberdeen, Idaho

L. L. Sanford

The objective of the cooperative USDA--University of Idaho potato breeding program is the development of high yielding, good quality varieties resistant to common scab, *Verticillium* wilt, early blight, "eumartii wilt" (*Fusarium solani* f. *eumartii*), and leafroll. The selection of varieties with long, russeted tubers is stressed.

In 1964, forty-nine clones selected for their disease resistance and horticultural attributes were crossed in 255 combinations. A total of 14,000 seedling tubers were planted in the field and 277 seedling hills were saved for testing. First-year selections from 1963 were planted in five-hill plots, and 43 of 163 (25 per cent) were saved for further testing. Reaction to *Verticillium* wilt and common scab, in addition to specific gravity measurement and external quality of the tubers, form the basis for selection in these plots.

Seed stock for the program is grown at the Tetonia Branch Experiment Station and 209 clones were increased there in 1964. First-year seedling selections made at Aberdeen in 1963 were indexed in a winter test at Mesa, Arizona before being planted in the Tetonia seed-increase. Of the selections indexed (160), 26 were discarded due to disease.

Aberdeen Yield Trial: This trial included 33 selections with Russet Burbank, Shoshoni, Mamominee, Kennebec, and Early Gem as check varieties. Twenty hills of each, spaced 11 inches apart in 36-inch rows, were replicated four times in a randomized, complete block design. Soil-type was a clay-loam with 160 pounds of fertilizer (16-20-0) per acre added. The trial was planted May 13 and harvested October 5. Temperatures during early June and the latter part of August were below average, and this, combined with early frost, the first of which occurred on August 19, caused yields to be reduced. Defoliation due to *Verticillium* wilt was considerably less than in 1963. The results of this trial are shown in Idaho table 1.

Egin Bench Yield Trial: The Egin Bench area, located near Rexburg, Idaho, has a very light, sandy soil that is sub-irrigated and heavily infested with *Verticillium albo-atrum*. The 1964 trial (Idaho table 2) included 16 selections and four varieties. A randomized, complete block design with ten-hill plots in four replicates was used. The primary purpose of this trial is to test breeding material under severe conditions of *Verticillium* wilt.

Aberdeen Duplicate Ten-Hill Trial: Selections from five-hill plots are planted in a randomized, complete block design with two ten-hill replicates. This provides yield information in the second year after selection as single hills. Yielding ability is a good measure of resistance to *Verticillium* wilt as long as internal tuber symptoms are not serious. The 1964 trial (Idaho table 3) included 36 selections and four varieties.

Selection Committee Meeting: The selection committee is made-up of representatives from the potato industry in Idaho and includes growers, shippers, processors, potato extension specialists, and members of the station staff. The purpose of the committee is to aid the potato breeder in determining the acceptability, mainly from the type and external quality of the tubers, of selections in the more advanced testing stages.

The meeting in 1964 was held on December 9 with 16 members present. Thirty-three advanced selections and three varieties (Shoshoni, Russet Burbank, and Norgold Russet) were displayed for judging. Each member voted for the ten clones he determined to be best. Then the ten selections with the most votes were rated by each member for positions from 1 to 10. The data from the final rating were analyzed using the ranked or ordinal data method. Ordinal scores^{a/} were substituted for the rating-positions of each variety and analyzed in the usual manner.

Selection A5943-1 had a mean ordinal score significantly greater than those of the selections rated below it (Idaho table 4). Error variance (within selection variance) for each selection was calculated; the proportion of each to the total error variance is a measure of the judges' unanimity in rating each selection.

Fusarium solani f. eumartii--Field Test: Forty-one selections and varieties were tested for their reaction to "eumartii wilt." Seed pieces were dipped in a slurry of agar, water, and fungus growth and planted in the field using a randomized, complete block design with three-hill plots in three replicates.

Percent defoliation was taken on five dates during the growing season. The percentage of tubers infected (symptoms were used for this determination), and the number of tubers per plot were recorded on September 11.

Results of the test are presented in Idaho table 5. Analysis of readings for defoliation over dates and selections showed the interaction of reading dates and selections to be non-significant; that is, the relative position of the selections from low to high defoliation remained nearly the same during the growing season. The coefficient of variation was 99 percent for the first reading (July 10), then steadily declined to 22 percent for the last reading (August 10).

The number of tubers varied greatly, both between and within selections (C.V. = 60 per cent). Most of the selections had a high percentage of tubers infected. There seems to be little association between defoliation readings and infection of tubers; this was noted also in the 1962 test.

In comparing the 1962 and 1964 tests, three clones (A487-27, A576-2, and A378-2) had relatively low defoliation readings in both tests. Russet Burbank, Early Gem, and selection A483-17, three of the clones most resistant to foliage damage in 1962, were very susceptible in 1964. The only clone to show indications of resistance to tuber infection in both years was A495-6; it had less than any clone in both years' tests.

^{a/} Statistical tables for biological, agricultural and medical research (Sixth edition). R. A. Fisher and F. Yates. Table XX, p. 94.

Idaho table 1. Aberdeen yield trial, 1964.

Clone	Yield Per Acre				Specific Gravity	Vert. Wilt	1/		2/		Tuber Type
	Total Cwt.	No. 1		Small Rough			Scab Area	Type			
		Cwt.	Pct.	Pct.					Pct.		
Shoshoni	307	201	65	10	24	1.082	12*3/	0		Oblong russet	
Kennebec	289	216	75	11	14	1.083	24	2 - 5		--	
A60120-1	286	222	78	18	4	1.083	9*	1 - 5		Oblong russet	
F162-1A	268	190	71	17	12	1.084	28	0		Long russet	
A610-19	263	154	59	8	33	1.085	6*	0		Long russet	
A598-101	258	164	63	13	24	1.085	17	0		Long russet	
A180-26	258	121	47	24	29	1.086	24	0		Long russet	
W44-3A	250	165	66	25	9	1.095	12*	T - 1		Oblong light russet	
McDerminee	249	197	79	18	3	1.087	8*	0		--	
A598-3	249	178	72	13	15	1.080	8*	0		Long russet	
A610-101	247	91	37	17	46	1.090	8*	0		Oblong russet	
A374-3	247	173	70	11	19	1.090	11*	0		Oblong russet	
A59325-2	246	153	62	25	13	1.090	9*	0		Long russet	
B5010-3A	237	129	54	29	17	1.087	15*	T - 3		Oblong-long russet	
Russet Burbank	233	130	56	27	17	1.084	37	0		--	
A575-7	230	167	73	14	13	1.092	5*	0		Oblong russet	
I57397-2	225	187	83	13	4	1.087	50	T - 1		Round, smooth skin	
A483-17	223	151	68	11	21	1.087	4*	0		Long russet	
A580-2V	221	135	61	20	19	1.084	24	0		Oblong-long russet	
A589-43	220	147	67	13	21	1.086	37	0		Long russet	
A477-11	218	158	73	19	8	1.089	15*	0		Oblong russet	
A59159-1	217	111	51	12	37	1.080	3*	0		Oblong russet	
A483-6	214	139	65	13	21	1.086	24	0		Long russet	
A589-65	213	151	71	18	12	1.094	6*	0		Long russet	
A587-27	212	128	60	20	20	1.079	6*	0		Round russet	

continued

Clone	Yield Per Acre					Specific Gravity	Vert. Wilt	<u>1/</u>		Tuber Type
	Total	No. 1	Small		Rough			Area Type	Scab	
			Gwt.	Pct.						
A492-2	211	124	59	30	11	1.099	3*	T - 3	Oblong russet	
A535-9	209	119	57	21	22	1.099	11*	0	Oblong russet	
A583-7	208	146	66	16	18	1.084	15*	0	Oblong russet	
A575-9	206	127	62	23	15	1.097	6*	1 - 5	Oblong russet	
A594-3	204	123	60	21	19	1.091	15*	0	Long russet	
A59298-5	198	128	65	19	16	1.082	12*	0	Oblong russet	
Norgold Russet	197	111	56	39	5	1.076	69	0	Long-oblong russet	
A466-2	191	144	75	13	12	1.100	5*	0	Round russet	
A463-4	191	108	57	25	18	1.086	15*	0	Oblong russet	
A496-4	188	131	69	17	13	1.099	5*	0	Round russet	
A6056-1	187	131	70	8	22	1.084	8*	0	Oblong russet	
A469-4	183	134	73	17	10	1.100	8*	0	Round russet	
Early Gem	165	109	66	16	17	1.073	81	0		
LSD .01	19	57				0.007				

1/ Defoliation reading on August 27 (readings are confounded with defoliation due to earliness).

2/ Area covered: T, less than 1%; 1, 1 to 20%; 2, 21-40%; 3, 41-60%; 4, 61-80; 5, 81-100%.

Type of pustule: 1, very small and superficial, to 5, large pitted pustule.

3/ Asterisk indicates a significantly (P=.05) lower amount of defoliation when compared to that of Russet Burbank.

Idaho table 2. Egin Bench yield trial, 1964.

Clone	Yield Per Acre				Specific Gravity	Verticillium <u>1</u> / Wilt	
	Total Cwt.	No. 1 Cwt.	Pct.	Small Pct.		Pct.	Pct.
A575-7	381	139	37	46	1.072	8*2/	
A180-26	374	199	53	36	1.073	8*	
A598-3	365	191	53	20	1.069	9*	
Menominee	350	234	66	24	1.075	8*	
Shoshoni	350	212	61	30	1.059	12*	
Russet Burbank	332	185	56	35	1.073	41	
A610-19	315	192	61	20	1.066	12*	
A583-7	315	99	31	28	1.064	8*	
A483-17	309	174	57	22	1.067	8*	
Early Gem	308	228	74	12	1.056	71	
A594-3	298	177	59	31	1.081	12*	
A483-6	297	162	54	34	1.068	42	
A496-4	295	130	45	27	1.078	6*	
A463-4	288	120	41	53	1.067	13*	
A469-4	287	136	48	25	1.075	6*	
A580-2V	277	102	37	35	1.068	9*	
A492-2	261	120	46	49	1.078	8*	
A466-2	241	131	55	28	1.078	6*	
Norgold Russet	233	152	65	33	1.064	82	
LSD .01	80	63			0.008		

1/ Mean of two readings (August 18 and 26) for amount of defoliation (readings are confounded with defoliation due to earliness).

2/ See footnote 3 table 1.

Idaho table 3. Aberdeen duplicate ten-hill trial, 1964.

Clone	Yield Per Acre						Specific Gravity	Vert. 1/ Wilt	2/ Scab	Tuber Type
	Total Cwt.	No. 1		Small		Rough Pct.				
		Cwt.	Pct.	Cwt.	Pct.					
A6085-6	359	222	62	9	29	1.075	31	0	Oblong russet	
Shoshoni	352	136	39	15	47	1.081	4*3/	0	Oblong russet	
A170-9	345	89	26	22	52	1.072	24	0	Long russet	
Kennebec	334	168	50	16	33	1.076	31	1 - 5	--	
A60154-1	306	250	82	4	14	1.079	12*	1 - 2	Round smooth skin	
A60158-1	298	189	63	25	12	1.089	31	0	Oblong light russet	
Russet Burbank	287	118	41	17	42	1.090	31	0	--	
A60124-1	283	135	48	16	36	1.090	24	0	Oblong russet	
A6063-2	282	107	38	29	33	1.091	9*	0	Oblong russet	
A60215-1	279	136	49	16	36	1.079	24	0	Long russet	
A595-15	279	139	50	10	40	1.081	31	0	Long russet	
A495-6	278	185	67	29	4	1.085	4*	2 - 5	Oblong light russet	
A575-100	274	153	56	17	27	1.075	31	1 - 2	Oblong "	
B5447-1A	274	159	58	23	19	1.080	50	2 - 5	Round light russet	
A6077-1	273	131	48	23	29	1.075	17	T - 1	Long russet	
A6085-2	272	166	61	28	11	1.098	17	0	Round russet	
Menominee	266	207	78	9	13	1.091	6*	0	--	
A378-2	263	167	64	29	5	1.079	4*	T - 1	Round russet	
A594-11	257	113	44	43	13	1.098	17	0	Oblong russet	
A5943-1	256	184	72	20	8	1.085	50	0	Long russet	
A60183-1	248	182	73	16	11	1.088	6*	0	Round smooth skin	
A60146-1	248	135	55	8	37	1.079	4*	0	Oblong russet	
A59216-4	247	128	52	11	37	1.082	17	0	Long russet	
A59186-3	240	116	49	20	31	1.079	31	0	Oblong russet	
A477-8	234	76	32	17	51	1.073	31	0	Long russet	

continued

Idaho table 3 continued.

Clone	Yield Per Acre				Specific Gravity	Vert. Wilt	1/		Tuber Type
	Total Cwt.	No. 1		Small Pct.			Rough Pct.		
		Cwt.	Pct.					Pct.	
A59153-1	226	167	74	22	4	1.082	9*	0	Round russet
A59160-4	221	134	61	10	29	1.083	17	0	Oblong light russet
A5943-3	218	174	80	15	5	1.079	60	0	Round light russet
A394-1	216	122	57	26	17	1.081	9*	0	Oblong russet
A6059-4	214	101	47	25	28	1.083	41	0	Long light russet
Early Gem	208	118	56	12	32	1.071	77	0	---
A6059-2	205	103	50	24	26	1.083	17	3 - 1	Long russet
A501-7	203	68	34	38	28	1.077	17	0	Oblong russet
A59160-3	202	119	59	11	30	1.082	6*	0	Oblong russet
A6059-8	197	57	29	34	37	1.083	31	0	Oblong russet
A5901-1	170	94	55	36	9	1.083	17	0	Round light russet
A59316-1	155	97	62	22	16	1.086	9*	0	Round russet
A60150-1	142	102	71	17	12	1.081	60	0	Round russet
A59238-1	138	86	62	38	0	1.071	88	0	Oblong light russet
ISD .01	74	89				0.009			

1/ See footnote 1 table 1.

2/ See footnote 2 table 1.

3/ See footnote 3 table 1.

Idaho table 4. Selection committee ratings, 1964.

Rank	Clone	Parentage	Mean 1/ Ordinal Value	Partition 2/ of Error Variance
				Pct.
1	A5943-1	A468-8 x A55-4	1.185	4
2	A589-43	A36-1 x A180-24	0.4787 a	8
3	A483-6	Sequoia x A119-15	0.4250 a	5
4	A598-101	A327-3 x A183-11	0.4075 a	14
5	A610-19	A173-3 x A405-1	-0.0125 ab	15
6	B5010-3A	B3478-45 x A180-26	-0.2125 bc	9
7	A598-3	A327-3 x A183-11	-0.2962 bc	14
8	A589-65	A36-1 x A180-24	-0.5887 c	4
9	Norgold Russet	A119-1 x ND2475-8	-0.6237 c	20
10	A595-15	A350-3 x A180-26	-0.7000 c	6

1/ Means from ratings of 16 judges. Duncan's Multiple Range Test (P=.05) used to separate means.

2/ Proportion of error variance due to each clone.

Idaho table 5. Fusarium solani f. eumartii--Field Test.

Clone	1964			1962	
	Defol- iation ^{1/} Pct.	Tuber Infection Pct.	No. 2/ Tubers	Defol- iation ^{3/} Pct.	Tuber Infection Pct.
A487-27	20	36	18	30	89
A598-101	28	60	12	-	-
A59298-5	30	63	7	-	-
A576-2	30	66	10	4	94
A378-2	31	82	7	5	88
A580-2V	31	46	8	-	-
A589-65	33	33	7	-	-
Menominee	33	75	12	45	95
A463-4	35	71	17	58	78
A60120-1	35	67	19	-	-
A180-26	37	78	7	-	-
F162-1A	37	68	15	-	-
A575-9	39	75	11	-	-
A477-11	41	39	12	71	97
A575-7	41	67	4	-	-
A44-3A	41	93	10	-	-
A492-2	42	32	22	69	-
A495-6	44	15	10	36	67
A598-3	44	65	6	-	-
A594-11	46	41	10	29	94

continued

Idaho table 5, continued.

Kennebec	48	70	16	-	-
A583-7	50	67	6	-	-
Early Gem	50	85	6	17	98
A483-6	54	82	7	-	-
A380-5	56	78	7	37	98
A597-25	56	49	12	24	90
Norgold Russet	56	78	15	-	-
A503-42	58	78	8	33	93
A610-19	58	83	6	-	-
A469-4	60	82	6	73	79
A496-4	60	67	3	65	100
A374-3	63	31	5	-	-
A170-9	65	87	9	44	88
A59325-2	67	41	8	-	-
Russet Burbank	72	64	7	4	79
I57397-2	77	83	6	-	-
A466-2	84	75	2	52	94
B5010-3A	87	83	2	-	-
A483-17	89	83	3	14	94
A594-3	89	83	3	-	-
Shoshoni	93	56	5	84	100
LSD .01	57	45	12		

1/ Mean of readings from 3 dates, July 22, 30 and August 17.

2/ Mean of 3 plants.

3/ Mean of readings from 3 dates, July 14, 27 and August 21.

SOUTHERN POTATO PROJECT
(Louisiana Headquarters)
T. P. Dykstra

Growing Conditions. The potato growing season in 1964 in the Southern States as a whole was favorable. In the locations in Louisiana where the yield plots are planted, climatic conditions seemed almost ideal and an unusually high yield was expected. During the last week of April and the first part of May, a hot spell prevailed, which may have been the reason for a somewhat lower yield than was anticipated.

Our plot at the Plaquemines Parish Experiment Station at Diamond in Southern Louisiana is generally planted the first week of January. Because of excessive rains the heavy river bottom land had to be prepared while it was still too wet. This adversely affected the soil texture in areas in the plot and resulted in pronounced variation and unsatisfactory yields of the same varieties. Only average yield of each variety is given in Dykstra table 5.

Favorable growing conditions prevailed at the Cumberland Plateau Experiment Station at Crossville, Tennessee, where the isolated increase plots of seedlings are located and good yields were obtained. The temperature during early June was unusually high for this location where ordinarily the minimum daytime temperature is about 60° F., and the maximum seldom exceeds 80° F. This year the maximum temperature was 92° F. for several days in succession, resulting in a disaster for the pollination efforts.

Seedling Testing

There is a demand in the South for a long white variety that has good baking qualities, that can be grown successfully under Southern conditions, and that can be harvested a few weeks after the early red varieties have been dug; primarily for supplying the local markets.

Seedling TL 6937 seemed to fill this need since it has scab and late blight resistance and develops a long, smooth, shallow-eyed tuber of high specific gravity and is an excellent baker. It was not introduced as a commercial variety because its yields are low.

The development of a variety that had all good qualities of TL 6937, plus yielding ability, is desirable. Seedling TL 1859 is such a variety and has the same characteristics as TL 6937, including high yields. The commercial market does not want potatoes with a pink skin. Therefore, TL 1859 was not named. We consider it the best parent in our collection. Seedling TL 1859 is also highly fertile and is used extensively in the breeding program since it is the best parent.

When TL 1859 is crossed with a red variety, excellent red color has been found in seedlings from its progenies and when crossed with a white variety, a high percentage of seedlings are good whites. In 1961 crosses between reds were made, but major emphasis was placed on making crosses using TL 6937 as the female parent and TL 1859 as the male parent to develop a seedling having long, smooth, white tubers suitable for baking. Because of favorable conditions, a large number of seedballs developed. The seed harvested that fall was planted in the greenhouse at Baton Rouge, Louisiana. Vigorous plant growth developed, and tubers of good size and desirable shape were formed in the 3-inch pots in which each individual

seedling was transplanted. On the basis of general appearance, selections were made from these potted plants. Each selection was harvested individually and its tubers were placed in a marked paper bag. In the spring of 1962, the seedlings saved from the greenhouse crop were planted at a hill lot at Crossville, Tennessee. A high percentage of these growing under field conditions in 1962 and 1963 looked exceptionally good. Sufficient tubers of the very best of these were saved for planting 20 hills in 1964 in one or more locations in Louisiana (Dykstra tables 2 and 4). The remainder was planted for increase in Tennessee.

Promising Seedlings

Seedling TL 7935 looks very promising as a red variety and has performed well in the South and in the seed-producing areas of the Northern States. It was included in the North Central Regional Test in 1963 and 1964 with very satisfactory results. It may be introduced soon as a named variety.

Seedling TL 8197. This seedling also produces excellent red tubers and shows considerable promise and will be included in the 1965 regional trials.

Seedling TL 7627. This seedling develops very good white tubers of high specific gravity and high yield, produces very good chips, and was included in the 1963 and 1964 North Central Regional Test. It has done exceptionally well in North Dakota and Missouri.

Seedling TL 8117. This white seedling has produced a high yield of long, smooth, shallow-eyed, white tubers. Although its specific gravity is low, it is outstanding as a baker and will be included in the 1965 regional trials.

Disease Testing. All the acceptable seedlings are tested for scab and late blight resistance.

Testing Out-of-State. All the seedlings that are potentially promising are grown by cooperators in Southern States. The outstanding seedlings are grown for increase and adaptability studies in the Northern seed potato producing areas.

Dykstra table 1. Seedling variety yields at Baton Rouge, Louisiana, 1964^{1/}

Accession Number	Parentage	Yield Per Acre U.S.No.1 Cwt.	Specific Gravity ^{3/}
TL 8194 ^{2/}	TL 3769 x TL 6937	262	61
TL 8131	ND 2910-1 x TL 1859	246	70
TL 8244 ^{2/}	ND 2910-1 x TL 1859	246	59
TL 7935	ND 2910-1 x TL 1859	240	59
TL 8197	ND 2910-1 x TL 1859	234	66
TL 8240 ^{2/}	ND 2910-1 x TL 1859	234	59
LaSoda		224	59
TL 7627 ^{2/}	B 606-37 x Cherokee	219	67
TL 8188	TL 6875 x TL 1859	219	65
TL 8117 ^{2/}	LaSoda x TL 1859	219	59
TL 8133	ND 2910-1 x TL 1859	213	64
TL 8134	ND 2910-1 x TL 1859	202	64
LaChipper ^{2/}		192	67
TL 8269	TL 6896 x B4312-21	192	59
TL 8276 ^{2/}	B929-3 x TL 1859	186	63
TL 8263 ^{2/}	TL 6543 x TL 1859	181	
TL 8260 ^{2/}	TL 6543 x TL 1859	114	
LSD 5%		33	

1/ Average yield of 5 replications of 20 plants, each spaced 12 inches apart in rows of 4 feet wide.

2/ White seedling varieties, the remainder produced red tubers.

3/ 1.0 omitted from all specific gravity ratings.

Dykstra table 2. Seedling yields at Baton Rouge, Louisiana, 1964^{1/}

Accession Number	U.S.No. 1 Tubers Per Acre Cwt.	Specific Gravity ^{2/}	Accession Number	U.S.No. 1 Tubers Per Acre Cwt.	Specific Gravity ^{2/}
TL 8291-61	219	71	TL 8291-9	162	63
" -54	219	66	" -81	156	65
" -86	219	59	" -28	156	
" -2	211	64	" -71	156	70
" -50	206	63	" -37	156	69
" -41	206	64	" -74	156	74
" -63	195		" -26	156	66
" -37	190	69	" -24	156	66
" -39	190	68	" -25	151	
LaChipper	190	67	" -52	151	73
TL 8291-65	185	66	" -30	151	59
" -15	184		" -82	140	74
" -85	179	76	" -8	140	
" -29	179		" -46	134	66
" -36	178	63	" -84	134	
" -47	167	70	" -41	134	68
" -72	162	65	" -4	128	64
" -29	162	66	" -39	128	
" -3	162	66	" -11	128	
" -17	162	60	" -38	128	71
" -7	162	60	" -68	128	70

1/ Yield of 20 plants from seedlings selected from the progeny of TL6937xTL1859.

Every one of these seedlings developed long, smooth, white tubers.

2/ 1.0 omitted from all specific gravity ratings.

Dykstra table 3. Seedling variety yields at New Roads, Louisiana, 1964^{1/}

Accession Number	Parentage	Yield Per Acre U.S.No.1 Cwt.	Specific ^{3/} Gravity
TL 8117 ^{2/}	LaSoda x TL 1859	241	58
TL 8244 ^{2/}	ND 2910-1 x TL 1859	223	60
TL 8194 ^{2/}	TL 3769 x TL 6937	215	62
TL 7935	ND 2910-1 x TL 1859	212	61
LaRouge		196	59
LaChipper ^{2/}		171	68
TL 7627 ^{2/}	B606-37 x Cherokee	165	76
TL 8188	TL 6875 x TL 1859	162	68
TL 8133	ND 2910-1 x TL 1859	157	63
TL 8131	ND 2910-1 x TL 1859	154	69
TL 8134	ND 2910-1 x TL 1859	139	70
TL 8197	ND 2910-1 x TL 1859	136	67
TL 8289	TL 6894 x B4312-4	130	58
TL 8269	TL 6896 x B4312-21	104	57
LSD 5%		41	

^{1/} Average yield of 4 replications of 30 plants, each spaced in rows 6 feet wide.

^{2/} White seedling varieties, the remainder produced red tubers.

^{3/} 1.0 omitted from all specific gravity ratings.

Dykstra table 4. Seedling yields at New Roads, Louisiana, 1964^{1/}

Accession Number	Yield Per Acre U.S.No.1 Cwt.	Specific ^{2/} Gravity	Accession Number	Yield Per Acre U.S.No.1 Cwt.	Specific ^{2/} Gravity
TL 8291-50	257	63	TL 8291-71	187	65
" -41	257	65	" -65	178	65
" -2	244	63	" -3	178	65
" -74	232	71	" -49	170	64
" -53	231		" -45	161	62
" -37	213	64	" -52	152	
" -24	213	65	" -68	152	74
" -48	209		" -6	126	59
LaChipper	198	65	" -86	104	60
TL 8291-17	187	62	" -8	91	58

^{1/} Yields of 30 plants from seedlings selected from the progeny of TL 6937 x TL 1859. Every one of these seedlings developed long, smooth, white tubers.

^{2/} 1.0 omitted from all specific gravity ratings.

Dykstra table 5. Seedling variety yields at Diamond, Louisiana, 1964^{1/}

Accession Number	Parentage	Yield Per Acre U.S.No. 1
		Cwt.
TL 7627 ^{2/}	B 606-37 x Cherokee	185
TL 8269	TL 6896 x B 4312-21	174
TL 8194 ^{2/}	TL 3769 x TL 6937	174
TL 7935	ND 2910-1 x TL 1859	168
LaRouge		163
TL 8134	ND 2910-1 x TL 1859	163
TL 8131	ND 2910-1 x TL 1859	158
TL 8240 ^{2/}	ND 2910-1 x TL 1859	120
TL 8117 ^{2/}	LaSoda x TL 1859	109
TL 8188	TL 6875 x TL 1859	103
LaSoda		87
LaChipper ^{2/}		75

^{1/} Average yield only of 5 replications of 20 plants, each spaced in rows 4 feet wide. Yield excessively variable, as mentioned in text.

^{2/} White seedling varieties, the remainder developed red tubers.

U. S.-Colorado Potato Experiment Station, Greeley, Colorado
S. A. Alfieri, Jr. and R. J. Young

The potato program for the Western Regional Area continues to emphasize the development and production of new potato varieties to meet the needs of the potato industry and consumers. In the potato program stress is centered on potato quality for processing and fresh use, disease resistance, and superior horticultural characteristics.

Cooperative potato research projects are in progress with individuals and institutions having an interest in potato production and are encouraged. Field tests for disease resistance and adaptation are employed at the Greeley Station.

Breeding. The breeding program is carried out in the greenhouses at Greeley. The program emphasizes the selection of superior seedlings with high quality and yielding ability, substantial resistance to *Verticillium* and *Fusarium* wilt, common scab, leafroll, early and late blight, viruses A, S, X and Y, and chipping quality.

First-Year Seedlings. First-year seedlings are planted in the field on 34-inch rows, 3 feet apart in the row. A total of 45,000 seedlings representing the progenies of 174 families was planted in the field as single hills during the 1963 growing season. Of this number approximately 18,000 were produced at Greeley, Colorado, 12,000 from the Beltsville, Maryland program and 15,000 at Prosser, Washington. Based on horticultural characters the following number of seedling selections were made: 769 (4%), 731 (6%), 387 (3%), respectively, a sum total of 1887 seedlings selected.

The first-year seedlings were planted in the San Luis Valley and at the Cheyenne Horticultural Field Station, Cheyenne, Wyoming. The selections from them will be planted in single 12-hill lots in 1965 for further observation, selection and increase.

12-Hill Seedling Lots. A total of 442 selections was made from 2230 seedlings in (12-hill plantings) in 1963, and will be replanted in 12-hill units in 1965 for further observation, selection and increase.

Advanced Selections. All seedling lines surviving by continued selection beyond the third year are increased as rapidly as possible for seed stock to be utilized for local and regional yield trials.

Disease Testing. Determining disease resistance of potato seedlings is important in a potato breeding program. The diseases considered here are common scab, *verticillium* wilt, *rhizoctonia*, blackleg, leafroll, and the viruses S and X.

Common Scab. A scab nursery plot for testing new seedling lines and standard varieties has been established at the Cheyenne Horticultural Field Station, Cheyenne, Wyoming. Certain locations were found to be heavily and uniformly infested with the scab organism from preliminary tests in past years. The results of the scab test for 1964 are presented in Greeley table 1. The results are reported on the basis of 4-hill plots.

Verticillium Wilt. *Verticillium* wilt is one of the more important soil-borne fungus diseases of potato. This ubiquitous organism increases the importance of the disease testing program.

The 1964 trial, located at the Greeley Station, was planted May 21 in a field that had been plowed out of alfalfa hay. The experimental design was a completely randomized block with 10 plants per plot and 3 replications. Plants were evaluated on August 25-29. Ontario, Katahdin, Kennebec, and Norland were used as controls, Ontario being resistant and Norland fully susceptible. Greeley table 2 gives the overall results of the test for the selections showing good resistance to verticillium wilt for 2 years.

Greeley table 1. Common scab field test of potato lines conducted at Cheyenne Horticultural Field Station, Cheyenne, Wyoming, 1963.

Pedigree	Scab _{1/2/} Reading	Pedigree	Scab Reading	Pedigree	Scab Reading	Pedigree	Scab Reading
N.Y. Rural	2-1	Blanca	0-0	G5262-14	2-1	DT5994-1R	3-3
B400-1	1-1	Cherokee	1-1	B5288-16	3-1	" -2R	3-2
B2368-13R	3-3	Chippewa	4-3	" -18	2-1	DT6003-1R	3-2
B3309-8R	4-2	Delus	4-4	BL4472-1	3-3	DT6028-1R	2-3
B4824-8R	3-2	Early Gem	1-2	BL4576-2	3-3	DT6063-1R	3-2
DT6080-2R	4-1	Early Ohio	1-1	BT4593-5R	3-4	" -2R	2-1
Ia5869-1R	2-1	Haig	1-1	BT4841-3	2-3	DT6068-1R	3-1
Ia58159-1R	0-0	I. Cobbler	3-3	BT4992-3	4-3	" -2R	3-1
TL6894R	2-2	Katahdin	2-2	BT4994-2R	4-2	IL5711-1	3-2
Triumph	3-4	Kennebec	2-2	BT5003-2	3-2	IL5821-1	0-0
Bounty	4-1	Menominee	0-0	BT5009-2	3-3	IT56317-4	3-2
Catoosa	Tr	Merrimack	3-1	BT5016-2	2-3	IL57410-2R	1-1
LaRouge	3-1	Navajo	2-1	" -4	4-2	IT59186-1	1-1
Pioneer	3-1	Ona	Tr	" -6	2-2	G253-20	3-2
Pontiac	5-1	Onaway	2-1	BT5043-1R	3-1	" -25	Tr
Red McClure	2-1	Penobscot	2-1	" -2R	4-3	G254-6	1-1
Viking	1-1	Russet Rural	2-1	BT5209-1	2-2	" -14	Tr
B24-58	5-2	White Rural	2-2	" -9	2-1	" -24	1-1
B595-76	0-0	Saco	3-3	BT5210-7	3-2	" -28	4-1
B859-10	1-1	Saranac	0-0	BT5213-6	3-1	G256-2	0-0
B926-9	0-0	Shoshoni	0-0	BT5215-1	2-2	" -7	1-1
B2834-3	2-1	LS 221	1-1	" -2	2-1	G257-1	1-1
B3726-6	0-0	46125	0-0	BT5218-6	1-1	G257-17	3-1
B3820-14	Tr	47156	2-1	" -7	1-1	G261-23	Tr
B3837-11	1-1	F46-31	1-1	BT5219-1	3-1	" -29	2-1
B4100-2	2-1	F5080	1-1	BT5220-4	4-1	" -33	2-1
B4467-7	2-1	Avon	2-1	BT5232-1R	1-1	G262-5	1-1
B4527-8	2-1	Marygold	3-1	" -3R	3-3	G263-11	1-1
B4814-10	2-1	G40-4	0-0	BT5404-2	2-2	" -26	3-3
BT5016-4	3-1	G59-3R	2-2	DT5297-1	3-4	" -38	Tr
CS11888	2-1	G69-5	4-3	DT5663-1R	3-2	G266-22	2-1
CS11889	2-1	" -14	3-3	" -2R	4-4	" -30	2-1
F 29	1-1	" -20	Tr	" -4R	2-2	G267-22	3-2
Norgold Russ	1-3	G76-4	0-0	DT5778-1R	3-3	G269-1R	3-1
TL6937	2-2	G109-1	2-3	" -2R	3-3	" -11R	3-1
X96-56	4-3	G148-12	2-1	DT5858-5R	3-4	" -14R	3-3
X627-164	1-1	G169-3	2-1	DT5946-1R	3-4	G271-2R	4-1
X927-3	2-2	G174-2	0-0	DT5973-3R	3-2	" -6R	0-0
X1276-185	3-1	G242-2R	2-1	DT5994-1R	4-3	G272-3R	1-1

continued

Greeley table 1, continued.

Pedigree	Scab Reading	Pedigree	Scab Reading	Pedigree	Scab Reading	Pedigree	Scab Reading
G272-6R	0-0	A6189-6	0-0	98-22	0-0	B4987-30	3-1
" -18R	2-1	" -7	0-0	"-32	2-2	B5023-42	0-0
G274-3R	3-1	B5397-4	3-3	102-10	2-1	B5032-18	2-2
G275-7R	0-0	" -10	0-0	110-18	3-2	B5035-5	Tr
G277-9R	3-1	B5428-7	2-2	111-10	Tr	B5036-45	2-2
" -10R	1-1	B5516-5	2-3	" -18	2-1	B5052-4	1-3
G280-3R	0-0	11-22	3-1	" -34	3-2	B5088-7	2-3
G281-9	0-0	70-34	1-1	" -38	2-2	B5089-8	2-3
" -22	2-3	74-7	2-2	B4769-1	3-2	" -18	2-3
G283-19	4-3	75-30	0-0	B4829-8	3-2	B5256-6	3-2
G285-27	3-3	80-22	0-0	B4835-8	2-2	B5260-3	3-2
" -44	1-1	" -26	0-0	B4859-4	0-0	B5263-4	0-0
G289-1R	2-1	90-4	2-2	B4878-7	3-2	B5268-4	1-1
A59161-1	3-4	98-5	0-0	" -21	3-3	B5287-36	1-2
" -2	2-1	" -7	0-0	B1590-2	Tr	B5304-7	1-2
A59208-4	Tr	98-11	2-1	B4987-16	2-1		

1/ First digit represents type pustule: 1 small, superficial; 2 large, superficial; 3 large, rough pustules; 4 large pustules, shallow holes; 5 large pustules, deep holes. Second number is surface area covered: Tr, Trace; 1, 0-20%; 2, 20-40%; 3, 40-60%; 4, 60-80%; 5, above 80%.

2/ Check readings equal 3-3 for scab.

Greeley table 2. Potato lines that have shown good resistance against verticillium wilt after one and two years of testing.

Pedigree	Parentage	1963 Wilt Index Aug. 23	1964 Wilt Index Aug. 25	Characters
47156		-	20	M W yellow flesh
B3820-14	X927-3 x Katahdin	-	0	ML W
DT6080-2R	B4916-6R x B4468-1R	-	13	L R ₂
LS205	Russet Rural x Katahdin	-	10	ML W Low sugar
46125		-	7	L W Low sugar
G109-1	A350-3 x B4128-14	-	23	ML W
G174-2	A125-7 x B4168-3	-	13	ML W
B4771-6	Yampa x B3608-19	0	13	L W
B4846-14	B4159-8 x Yampa	0	23	ML W
B4987-30	41756 x B3139-24	0	20	M W
B4987-34	" x "	0	20	M W
B5001-3	B3139-24 x B2834-3	0	23	ML W
B5022-17	B3950-1 x A180-26	0	13	ML W
B5032-3	B4146-4 x Cherokee	0	23	L W
B5032-18	" x "	0	20	ML W
Ona	B3021-3 x B2968-31	6	20	ML W
Populair	Ac 25635	-	17	ML W
B3454-5R	B3368-2 x B3368-17	0	23	ML W
B3556-11	B595-76 x B24-58	0	20	ML W

1/ Rating System, Barratt and Horsfall.

2/ Rating System--Based on a system of 1-10, average of 3 replications: a, 0-23% resistant; b, 27-43% tolerant; c, 47-60% susceptible; d, 63-100% very susceptible.

Also, evaluation of 191 breeding lines for resistance in 1964 breakdown into 19% resistant, 39.3% tolerant, 32% susceptible and 9.4% very susceptible. The correlation between verticillium wilt resistance (vine symptoms) and maturity for these data support the findings of other workers, (Sanford and McLean). Seedlings 47156 and 46125, both high in starch and low in sugar, show high resistance to foliage symptoms but both lines show extensive stem-end discolorations.

Rhizoctonia disease. A limited screening method was designed to study the resistance in potato against Rhizoctonia solani, and at the same time determine the types of damage that results from invasion by this fungus. The trial was planted May 27 in naturally infested soil. Fourteen varieties were planted in a completely randomized block design using three replications and 40 plants per replication. Pinto beans were planted in the row for the purpose of building up inoculum and also to serve as a biological assay. The majority of the bean plants showed typical Rhizoctonia lesions whenever observed.

After 60 days ten plants, from each variety, 30 plants total, were pulled and the stems were evaluated for Rhizoctonia lesions. The results indicated considerable variations within replications, however, trends did develop.

Greeley table 3. A partial list of 14 varieties tested for resistance against Rhizoctonia solani in Greeley, Colorado, 1964.

Variety	Stem Lesion Index ^{1/}	
1. CS11889	4.01	Susceptible
2. Russet Burbank	2.45	
3. White Rural	1.68	
4. Blanca	0.59	
5. Ona	0.58	Resistant

^{1/} The stem lesion index was derived by dividing the total number of weighted stem lesions by the number of stems. The resulting value was then divided by the total number of plants.

(No. Lesions)

$$\frac{(\text{No. Stems})}{\text{No. Plants}} = \text{Index}$$

Greeley table 4 shows the type of information derived from this test. At harvest no significant degree of correlation could be made between the numbers of Rhizoctonia infected hills and the severity, size and number of stem lesions. White Rural had a disease index of 1.68 and at harvest 10 percent of the remaining plants showed Rhizoctonia damage. Ona had only one Rhizoctonia hill and CS11889 (Colorado Seedling) having the greatest stem lesion index showed no Rhizoctonia hills. This problem remains a difficult one to resolve, but perhaps with the use of soil fumigation the damage resulting from this soil-borne organism can be more accurately assessed.

Potato Chipping. Testing for potato chipping has been initiated as a part of this program. Chipping tests were conducted by Dr. Milton Workman, Department of Horticulture, Colorado State University, Fort Collins, Colorado. A total of 124 potato lines were chipped. These lines were held in common storage (40-50°F) since harvest and chipped immediately out of common storage, then again after being held for 2 weeks at 70°F. Greeley table 4 presents the results of these chipping tests. Only potato lines having a favorable chip index of 30 or above are reported along with their respective specific gravity.

Cooperative Research. Cooperative potato research projects were conducted as part of a continuous program between this Station and the Colorado Agricultural Experiment Station of Colorado State University, Fort Collins, Colorado. The following experiments were conducted at the U. S.-Colorado Potato Experiment Station, Greeley, Colorado, with Dr. Milton Workman of the Department of Horticulture, Colorado State University and this Station.

Greeley table 4. Potato chipping test, Fort Collins, Colorado, 1964.

Pedigree	Chip Color Index		Specific Gravity ^{3/}
	Immediately out of common storage ^{1/}	After 2 weeks ^{2/} Reconditioning period at 70° F.	
G253-11	14	34	83
" -20	30	31	77
G254-4	22	35	74
G256-2	32	30	83
" -7	28	32	78
G257-1	31	27	77
" -2	30	34	85
" -17	33	31	77
G266-24	35	21	73
G267-3	37	31	78
G281-14	22	33	81
" -21	32	38	79
" -23	29	34	72
G283-22	33	28	81
G285-4	27	30	98
" -23	24	33	79
" -44	22	30	68
B5397-15	28	34	78
B5428-10	32	31	77
70-13	20	30	76
" -15	32	33	93
80-24	18	39	69
89-32	31	26	72
95-4	35	27	80

^{1/} Chipped immediately out of common storage.

^{2/} " after 2 weeks reconditioning at 70° F. (1-5-64).

^{3/} 1.0 omitted from all specific gravity ratings.

An Evaluation of the Influence of 5 Irrigation Schedules on the Productivity, Specific Gravity and Processing Quality of 6 Potato Varieties. Six potato varieties were included in this test--2 late varieties, New York Rural and Russet Rural; 2 intermediate varieties, Kennebec and Haig; and 2 early varieties Norland and Norgold Russet (ND4192-3). Five different irrigation schedules were attempted. The frequency of irrigation in each of these was determined by soil moisture blocks, tensiometers and actual percent soil moisture determination by soil sampling. In Schedule 1 moisture was withheld early in the season and then maintained at what was considered adequate levels during the remainder of the season. In Schedules 2 through 5 moisture supply was progressively increased from a drought condition to abundant moisture. Each schedule was applied to an area 14 rows wide, spaced 34 inches apart and 550 feet long. This was divided into 4 plots 125 feet long. The remaining 50 feet was used as buffer between plots and ends of the rows. Each plot was treated as a replication and the 5 varieties were randomized within each plot. All varieties

were planted on May 13, 1964, and harvested on October 9, 1964. A frost on September 26, 1964, stopped growth on all varieties. The amount of green vine remaining at the time of the frost differed considerably according to variety and irrigation treatment.

The results obtained with the 6 varieties are given in Greeley table 5. The highest yield of U. S. No. 1 potatoes was obtained in all varieties with irrigation schedule number 5, the schedule receiving the highest number of irrigations. Except possibly for a brief period early in the growing season this schedule maintained soil moisture in abundance in the root zone. The next highest total yield was obtained in 5 of the varieties in schedule 3. Only the total yield of New York Rural was slightly higher in schedule 4 than in schedule 3. However, due to the larger number of culls in schedule 3 the yield of U. S. No. 1 potatoes was quite similar in schedules 3 and 4. Haig and Norland produced a high percentage of U. S. No. 1 potatoes in all schedules. However, with the Haig variety there was a progressive increase in culls going from the more to the less frequently irrigated schedules. Norgold Russet appears to definitely require uniform and abundant soil moisture to yield well and produce a high percentage of U. S. No. 1 potatoes. The percentage of green potatoes in Kennebec was quite similar in the 5 irrigation schedules. It was hoped that the variations in soil moisture level would have influenced depth of set. New York Rural, Kennebec and Russet Rural produced an excessive amount of cull potatoes in all schedules.

The Influence of Planting and Harvest Date on Yield, Specific Gravity and Chipping Quality of 6 Potato Varieties. The same 6 varieties used in the irrigation study were also incorporated in a planting and harvest date study. Three planting dates, April 28, May 13 and May 28, were used in conjunction with two harvest dates which varied according to the variety. The first harvest was done when the vines were beginning to show the first signs of maturity and the last harvest when the vines were down.

The varieties used and seed source are listed below: (1) New York Rural, Michigan (Walter Menza); (2) Russet Rural, San Luis Valley; (3) Kennebec, East Grand Forks (Neil Bros.); (4) Haig, Nebraska (X-free seed--Leon Glenn); (5) Norland, San Luis Valley; (6) Norgold Russet (ND4192-3), North Dakota (Walhalla-Dwight Holmes).

All seed was in excellent condition when received. The seed was cut approximately 10 per pound and stored in slatted crates in common storage until planting. At the first planting only Kennebec had visible sprouts. By the time of the second planting all seed had sprouted but not excessively. On the third planting average sprout length was one inch except Kennebec which had longer sprouts. There was no decay and seed was well healed. Soil moisture was excellent although a bit on the wet side. Alfalfa was grown on the soil the previous year. Five hundred pounds of 8-32-4 per acre were applied at planting about 2 inches below the seed piece. Planting distance was 13 inches and row spacing was 34 inches. The seed in each planting date was planted from one end of the field to the other to permit irrigation of each planting as needed. The irrigation program closely followed Schedule 4 in the irrigation study. At the time of the last planting the early planting was above ground.

Stand counts and number of stems per hill were made when plants were 8 to 10 inches above ground (Greeley table 6). The best stand for most of the varieties was obtained with the May 13 planting date. In certain varieties, e. g., New York Rural, stand was substantially improved by delaying planting until May 13. Delay in planting until May 28 tended to reduce stand slightly. The number of stems per hill increased with delay in planting date with most of the varieties. Only Kennebec, which was sprouted at the time of the first planting, produced about the same number of stems per hill on each date.

Greeley table 5. Influence of irrigation schedule on yield of six potato varieties, Greeley, Colorado, 1964.

Irrigation Schedule	Irrigations June 20-Sept.18 Number	Total Yield Per Acre					
		Rural N. Y.	Russet Rural	Kennebec	Haig	Norland	Norgold Russet
		Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
1	7	356	309	365	359	282	280
11	6	298	296	340	318	270	260
111	9	412	405	414	386	307	331
IV	11	433	383	376	361	296	284
V	13	444	427	392	431	349	340

Greeley table 6. The influence of date of planting on stand and number of stems per hill, Greeley, Colorado, 1964.

Variety	Planting Dates					
	April 28		May 13		May 28	
	Stand Pct.	Stems/hill No.	Stand Pct.	Stems/hill No.	Stand Pct.	Stems/hill No.
N. Y. Rural	83	1.7	98	2.0	94	3.1
Russet Rural	90	1.9	95	2.0	92	3.4
Kennebec	94	2.1	95	2.1	92	2.2
Haig	86	2.2	99	2.0	92	2.7
Norland	92	2.5	97	2.5	99	4.0
Norgold Russet	93	2.9	98	2.9	94	3.0

The yield results have been summarized in Greeley table 7. New York Rural performed best with the May 13 planting date and a September 14 harvest date. Delay in harvest until October 2 increased total yield but cullage accounted for all of the increased production.

Russet Rural responded similar to New York Rural. The May 13 planting happened to be located at the bottom end of the field and some problem with back up irrigation water occurred. If the May 13 planting had been located more favorably this planting would perhaps have performed still better. Delaying harvest of Russet Rural also increased the over-size and cull potatoes.

Delaying harvest of Kennebec increased total yield but most of the increase was accounted for in green and other cull potatoes. The April 29 planting and September 4 harvest of Kennebec gave a favorable yield of U. S. No. 1 potatoes. The early sprouting of Kennebec probably accounts for the good performance of the early planting.

The May 13 planting of Haig gave the highest total yield and yield of U. S. No. 1 potatoes. Delaying harvest until September 25 increased the yield of U. S. No. 1 potatoes slightly over the September 4 harvest.

Norland performed well from the early planting. Delaying harvest one month from August 20 to September 18 increased the yield only about 10 percent.

Norgold Russet appears to require a somewhat longer growing period than Norland to produce top yields. The May 13 planting date and the September 18 harvest date was most productive. A 20 percent yield increase occurred between August 20 and September 18. Perhaps most of this resulted during the first 2 weeks following August 20. Delay in planting until May 28 greatly reduced the yield of Norgold Russet.

Greeley table 7. Influence of planting and harvesting dates on total yield per acre of 6 potato varieties, Greeley, Colorado, 1964.

Variety	Planting Date	Early 1/ Harvest	Late 2/ Harvest	Variety	Planting Date	Early 1/ Harvest	Late 2/ Harvest
		Cwt.	Cwt.			Cwt.	Cwt.
New York Rural	Apr. 29	255	315	Haig	Apr. 29	350	320
" " "	May 13	326	376	"	May 13	381	431
" " "	May 28	224	290	"	May 28	296	318
Russet Rural	Apr. 29	204	306	Norland	Apr. 29	314	348
" " "	May 13	305	349	"	May 13	247	319
" " "	May 28	193	240	"	May 28	286	292
Kennebec	Apr. 29	311	348	Norgold Rus.	Apr. 29	326	254
"	May 13	315	408	" "	May 13	313	377
"	May 28	289	325	" "	May 28	122	211

1/ New York Rural, Russet Rural and Kennebec were early harvested Sept. 14; Haig, Sept. 4; and Norland and Norgold Russet, Aug. 20.

2/ New York Rural and Russet Rural were late harvested Oct. 2; Kennebec and Haig, Sept. 25; Norland and Norgold Russet, Sept. 18.

Variety and Spacing Study. The varieties, Pioneer, Viking, La 62-162, LaRouge, Norland, and a USDA seedling number 47156 were planted at spacings of 8 and 16 inches. The seed was cut to 10 pieces per pound and was well healed when planted on May 14. The first 5 varieties are red and the last is a smooth potato with yellow flesh. Total yield and grade were evaluated after about one month in common storage with temperatures ranging from 45° to 50° F. Samples are also in 50° F. storage for future observations.

Pioneer produced smooth shallow-eyed tubers. Viking was somewhat rougher but much smoother than observed in last year's test. LaRouge was deep eyed and extremely rough. La 62-162 was fairly smooth and had a beautiful bright red color at harvest. But one month after harvest it was apparent during the grading operation that this variety was susceptible to skinning. All varieties were harvested on October 9 and should have been mature. A rather heavy frost occurred on September 26, killing from 50 to 75 percent of the vines. La 62-162 produced extremely long and heavy vines and in spite of the frost considerable green foliage was present at the time of vine removal one week prior to harvest.

The total yields from the eight-inch spacing ranged from 60 to 98 cwt per acre more than the 16-inch spacing. This yield increase was reflected for the most part in an increase in the U. S. No. 1 (2-3½ inch) potatoes. Only a slight increase in 1½-2 inch potatoes and with certain varieties a small decrease in over-size potatoes occurred. The similarity in the amount of over-size and cull potatoes at the two extreme spacings was not expected. Pioneer, LaRouge and Viking produced more over-size at the narrower spacing. It is generally assumed that a reduction in spacing would reduce the production of over-size potatoes.

La 62-162 gave the highest total yield of the 6 varieties but as mentioned before is very susceptible to skinning. LaRouge also yielded well but was very rough. Viking and Pioneer did not perform any better than Norland and are later. Pioneer is a fine smooth red potato with a good skin. Color measurements on fading were not made but should be done on red varieties in the future. Seedling 47156 yielded well and produced a high percentage of 2-3½ inch potatoes. From preliminary observations this variety may prove to be an acceptable chipper.

A Study of the Use of Growth Regulators in their Influence on Vine Growth and Tuber Set. Two growth regulating chemicals, CCC (2-chloroethyl trimethylammonium chloride) and B 995 (N-dimethylamino succinamic acid) were applied to Russet Burbank and Red Pontiac seed prior to planting and to the vines to determine the value of these materials to produce a more compact sturdy plant.

Gibrel (potassium gibberellate) was applied to Kennebec seed and to the vines to observe the influence on tuber set and yield. All seed treatments were applied just before planting on June 8.

The following treatments were studied with CCC and B 995.

CCC	B 995
1. seed dust - 1.9 gms per pound.	Same
2. seed dust and 800 ppm foliage spray at 5 wks.	Same but 2500 ppm.
3. 800 ppm foliage spray at 5 and at 6 weeks.	Same but 2500 ppm.
4. 1600 ppm foliage spray at 5 weeks.	Same but 5000 ppm.
5. 1600 ppm foliage spray at 5 and 6 weeks.	Same but 5000 ppm.

The B 995 seed treatment prevented germination of the Russet Burbank seed and reduced germination of Red Pontiac. The different response was most likely due to the fact that Red Pontiac was whole seed and Russet Burbank was cut.

The CCC seed treatment reduced stand slightly and growth rate varied between plants within a plot. This irregularity disappeared in a few weeks. The number of stems per seed piece was not changed by the CCC seed treatment (3.25 stems per hill from CCC-treated seed and 3.18 stem per hill in the controls). Foliar sprays of CCC did not reduce growth. Combining seed treatment and foliar spray reduced growth for a short time.

Foliar sprays of B 995 definitely retarded shoot elongation and produced a stocky compact plant. The effect increased with increasing concentration of B 995. Later in the season (mid-August) it was somewhat difficult to observe any differences. Continued application of B 995 most likely would have maintained the compactness.

The influence of various CCC treatments on yield and grade of Russet Burbank potatoes did not reduce yield below the controls. Maximum yield was obtained with the highest CCC concentration tested. It was also apparent that knobiness was reduced even though total cullage was not reduced. This observation encourages further trials with CCC.

B 995 reduced yield at higher concentrations and also seemed to increase knobiness. Total cullage was also increased. These observations negate any further testing with B 995 on Russet Burbank.

Seed treatment of Red Pontiac potatoes with either CCC or B 995 markedly reduced yield. Foliar sprays with either material, except 5000 ppm B 995 applied at 5 weeks, reduced yields. Differences may not be significant since only two replications were used per treatment. Cullage was not increased by CCC foliar sprays but was increased by B 995 foliar sprays. More cracking of Red Pontiac was apparent.

From these exploratory studies there seems to be no reason to continue studies with B 995. CCC should be tested further on Russet Burbank potatoes to verify or disprove this year's observation on a reduction in knobiness.

The following treatments with Gibrel were applied to Kennebec potatoes.

1. Seed piece dip--10 ppm 2 minutes immediately before planting.
2. 25 ppm applied to foliage at about 5 weeks.
3. 25 ppm applied to foliage at 5 and 6 weeks.
4. 50 ppm applied to foliage at 5 weeks.
5. 50 ppm applied to foliage at 5 and 6 weeks.

The seed piece dip prevented normal plant development and greatly reduced yields. The foliar sprays did not reduce yields and did not greatly alter the size distribution although there were fewer over-size potatoes from the Gibrel treated plants. Possibly the influence on size would have been more pronounced if the seed was planted earlier. There was no reduction in green potatoes.

The following experiments in potato research were conducted at the U. S.-Colorado Potato Experiment Station, Greeley, Colorado by Monty D. Harrison, Nagayoshi Oshima, and Clark H. Livingston of the Department of Botany and Plant Pathology, Colorado State University, Fort Collins, Colorado, at the Greeley USDA Station.

The Influence of Irrigation Schedule on Verticillium and Fusarium Wilt. Verticillium and Fusarium wilt notes were taken in the irrigation plots beginning at the time initial symptoms were observed and continuing at approximately weekly intervals until harvest time. Verticillium readings were made on the basis of the percent foliage showing symptoms at a particular time. The Horsfall-Barratt scale of 0-11 was used exclusively. Fusarium notes were recorded on the basis of the number of plants showing typical symptoms during the season. At harvest time 30-50 pound samples of tubers were taken from each sub plot in the study (120 plots). These samples were stored at 70° F. for 10-14 weeks and will be clipped during the month of January to determine the influence of soil moisture (irrigation) on Fusarium oxysporum tuber infection.

Results: Fusarium symptoms were difficult to evaluate as in past seasons. The separation of F. oxysporum infection in the absence of general wilting was practically impossible and tuber infection will be relied upon to provide an index of infection by the pathogen. Tuber samples collected at harvest time have been stored at 70° F. at Fort Collins and these will be evaluated during January. Results are not yet available.

Small amounts of Fusarium solani f. eumartii infection were detected during the season. Even though the number of infected plants was small it represents considerably more infection than was observed in previous years and warrants close observations in the future. The "eumartii" infections were not prevalent in the Russet Rural and New York Rural varieties and were more obvious in the "dry" irrigation Schedules I and II than in those receiving higher amounts of moisture. Some "eumartii" infection appeared in irrigation Schedules III, IV, V much later in the season but never to the extent observed in the drier plots.

Fusarium solani f. eumartii was successfully isolated from Russet Rural plants showing typical "eumartii" symptoms on August 22.

Isolation data from plants collected July 23, 1964, yielded little information regarding the degree of infection by Fusarium oxysporum. Successful isolations were rare and were distributed among all irrigation schedules. Little can be concluded from these data.

Verticillium wilt infection was first detected on August 3, in the variety Norgold Russet and progressed from that point throughout the season. In general, the early maturing varieties, Norgold Russet and Norland developed symptoms earlier and were more heavily infected than other varieties in the study. Kennebec and Haig developed symptoms somewhat later and Russet Rural and New York Rural began to show Verticillium symptoms very late in the season (Greeley table 8).

Greeley table 8. Verticillium wilt symptoms in 6 potato varieties grown at U. S.-Colorado Potato Experiment Station, 1964.

Variety	<u>3/</u> Observation date and percent infection							
	<u>1/</u> 7/24	8/3	8/12	8/18	8/28	8/1	<u>2/</u> 9/11	<u>2/</u> 9/18
Norgold Russet	5.0	13.0	28.0	19.5	42.0	65.0	81.5	88.0
Norland	4.5	6.0	23.5	23.5	52.0	75.0	85.0	91.5
Haig	2.5	2.5	10.0	5.5	15.0	21.0	40.5	69.0
Kennebec	.8	.6	8.5	5.0	13.0	12.0	23.5	59.5
New York Rural	2.5	1.2	3.0	3.0	1.6	3.0	7.0	14.0
Russet Rural	1.6	1.0	3.0	2.5	2.0	3.0	7.5	17.0

1/ Schedules I and II, very dry--readings in most varieties especially in dry treatments not highly accurate.

2/ Late readings were difficult due to natural maturity which tended to hinder wilt readings.

3/ Mean of 5 irrigation schedules.

Statistically the 6 varieties fall into 3 groups according to maturity with the early maturing varieties being more susceptible, at least from the standpoint of early symptom development, and the late maturing varieties least susceptible on the same basis.

Isolations made from random plants of each variety on July 23 and August 22, indicated extremely heavy early infections in Norgold Russet with heavy infections in Norland and Kennebec. Haig infection was slightly lower and Russet Rural and New York Rural showed relatively low infections in July. By mid-August, however, Russet Rural and New York Rural infections equalled or exceeded infections in other varieties. Norgold Russet infection remained very high throughout the season. These results are in general agreement with field disease readings except for the fact that Kennebec appears more susceptible early, according to isolation data than it appears in field readings and Norland appears less susceptible in the isolation data than in field readings. These reversals may be related to the relative maturity rates of the two varieties with Kennebec, a later maturing variety than Norland, failing to show symptoms early as Norland even though possibly more heavily infected.

Isolation data seem to indicate that Russet Rural and New York Rural are quite resistant to infection early in the season but that they tend to be readily infected as the season progresses.

Irrigation schedules had marked effects upon Verticillium expression in all varieties. Results were generally similar to those obtained in 1962 and 1963 with wet schedules showing increased damage due to Verticillium infection when compared with dry schedules at any given time. Isolation results indicate that somewhat more infection occurred in the wet treatments than in the dry. This relates well with field disease reading.

Conclusions: It appears that high moisture conditions favor *Verticillium* development in potatoes. These results have been consistent in irrigation studies for three consecutive years. The 1964 results would tend to indicate that high moisture favors infection of the potato plant. These results have been variable over the 3-year study series and more work must be done before conclusions can be drawn.

Early-maturing varieties tended to develop severe *verticillium* wilt symptoms earlier than later-maturing varieties. Isolation results indicated that some of the later varieties were as heavily infected early in the season as the early varieties again demonstrating the apparent tolerance of actively growing plants. The Rural varieties tended to become infected later in the season than other varieties in the test. This fact coupled with the lateness of these varieties resulted in very late appearance of wilt in these varieties. Even though apparently resistant to infection early, the Rural varieties became heavily infected as the season progressed.

The data presented above have not been completely evaluated and certain adjustments in interpretation may be made at a later date.

The Influence of Planting and Harvest Dates on *Verticillium* and *Fusarium* Wilts of Potato. Disease evaluations were made periodically, approximately weekly, in the date of planting--date of harvest plots. *Verticillium* wilt notes began on July 24, and continued at approximately weekly intervals until harvest time. *Fusarium* wilt notes were taken at the same time. Thirty to 50-pound samples of tubers were harvested from each sub plot on each of the two scheduled harvest dates, in addition, a third harvest date, one week prior to the first scheduled date was included. These samples were stored at Fort Collins at 68°-70° F. and clipped at 10 and 13 weeks to determine the degree of infection by *Fusarium oxysporum*.

A third harvest study was made in which several rows of Russet Rural potatoes planted on May 16, were selected. Twenty to 30-pound samples of tubers from each of three blocks were harvested weekly from September 11, through October 30. These samples were also stored for 10 to 13 weeks at 68°-70° F. and clipped to determine the amount of *F. oxysporum* infection. On September 11, when the first sample was taken, the plants in the study plot were green and healthy. They were killed by frost on September 26.

Stolons were collected at the time tuber samples were taken from September 25, through October 22. Isolations were made from these to determine the pattern of *F. oxysporum* invasion after vine maturity.

Verticillium wilt symptoms appeared first in the early planted plots as was expected. Symptoms appeared shortly after in the middle date of planting and considerably later in the late planted plots. Symptom development was rapid in early planted plots, much slower in plots planted at the middle date and intermediate in late-planted plots.

The later planting dates, particularly the middle date, were quite effective in reducing *verticillium* damage. These differences were particularly apparent after August 18, when symptom development in the early planted plots increased very markedly. In general, there was little difference between the middle and late planting dates regarding *verticillium* wilt development.

Comparisons among varieties showed that they behaved much the same as reported above in influence of irrigation with the 6 varieties falling generally into 3 susceptibility groups, according to their rates of maturity. Norgold Russet and Norland being most susceptible followed by Haig and Kennebec with R. Rural and New York Rural being most resistant. This relationship persisted across all 3 planting dates with exception in the case of the Kennebec variety. Kennebec appeared to interact with planting date in such a way that when planted early it behaved as an intermediately susceptible variety when compared with the Norgold Russet, Norland, and Russet Rural--New York Rural groups. When planted at an intermediate or late date, Kennebec developed symptoms more slowly and fell generally into the Russet Rural--New York Rural group. The interpretation of this phenomenon is not yet complete and conclusions regarding it would be premature.

Fusarium wilt was, as in the irrigation plots, difficult to evaluate from the standpoint of wilt symptoms in the vines. Trace amounts of "eumartii" wilt were observed during the season. There was a tendency toward more of this type wilt in early planted Russet Rurals than in other varieties or planting dates. The amount of infection was so small that no conclusions are warranted. Evaluations of the tuber samples collected from the above plots have been completed. Late planting markedly reduced the percent of tubers infected by F. oxysporum. No differences were observed between the early and middle planting dates.

Late harvest tended to increase infection as indicated by the averages for all dates of planting. This is true of results in the early planted plots. Apparently, increased tuber invasion is related to the period of time tubers lie in the soil beyond plant maturity. This condition apparently existed only in early planted plots since no obvious effect of harvest date was observed in middle and late planted plots. The decrease in infection at the middle harvest date in the late planted plots cannot be explained. The 6 varieties in the study varied considerably in susceptibility to F. oxysporum infection with amounts of infection ranging from 3.9% in Norland to 46.7% in Russet Rural.

Considerable aster yellows virus infection was found in some lots of tubers primarily in late maturing varieties and in late plantings and late harvest dates involving early maturing varieties. All samples collected before September 11, were nearly free from infection, while most of those collected on or after this date were infected to varying degrees. This indicates rather late spread of the virus which is in agreement with general observations in the Northern Colorado area this season.

The results of the study involving weekly harvest of Russet Rural tubers beginning September 11, and continuing through October 30. Stolons were also collected at the time tuber samples were dug and the amount of infection by F. oxysporum was determined by isolation methods.

With the exception of September 9, amounts of infection remained relatively constant until plant maturity then began to increase beyond that point. These results are in general agreement with those obtained in 1963 and indicate that considerable tuber invasion probably occurs after plant maturity while tubers lie in the soil. The same general trend is evident in the stolon isolation data with the exception of the October 9 sample.

Chemical Spray Trials--Insect Control on Potatoes. Chemical trials, primarily for the control of the green peach aphid, were conducted at the U. S.-Colorado Potato Experiment Station, Greeley, Colorado, by Dr. R. G. Simpson of the Department of Entomology, Colorado State University, Fort Collins, Colorado, at the Greeley USDA Station.

Russet Rural potatoes were planted on May 18 and 19, 1964 and harvested October 1, 1964. The plot consisted of a randomized block design with 4 row plots, 175 ft. rows (34-inch row spacing) with 12 ft. row spacings as buffers between replicates. Sprays were applied with a ground applicator at 120 gal. per acre (350 psi) on the following dates: June 29, July 13, July 27, Aug. 10, and Aug. 26.

The results of the use of 9 insecticides for the control of the green peach aphid are presented in Greeley table 9. The experimental material SD9129 proved to be an excellent control for the green peach aphid, the primary insect problem of potatoes in Weld County, Colorado. In time, it probably will be registered for use on potatoes. The next three materials, Thiodan miscible, Bidrin and Thiodan 50% W. P., again, gave good results in control. Both DiSyston E. C. and Thimet E. C. gave disappointing control of the aphid. Each of them are systemic but apparently were not absorbed too well by the plant. A second application of Thimet was made on July 27 at 1# per acre, however, aphids soon increased. The material 13005 has given good control of aphids in the East, but does not perform nearly as well in the West.

The Colorado potato beetle larval counts were judged to be more stable, since adult beetles move about from plant to plant, although ranking by adults does not vary materially from that of larval ranking (Greeley table 10). DDT was applied on August 4 at the rate of 1# actual per acre to prevent excessive damage to the plants.

Leaf counts and sweep net counts were made for both nymph and adult psyllids; the numbers were too low to determine chemical effectiveness.

Greeley table 9. Results of chemical tests for control of the green peach aphid. Greeley, Colorado, 1964.

Material	Rate Per Acre	Dates of Counts *				Total
		7/6	7/20	8/3	8/18	9/2
SD9129 2/3#/gal.	1 pt.	35-4 ^a	8-0	41-0	74-4	255-40
Thiodan Misc. 2#/gal.	1 qt.	44-8	111-0	98-1	296-5	495-85
Bidrin 8#/gal.	1/2 pt.	26-4	222-2	419-14	739-19	1,273-97
Thiodan 50% W.P1	1#	60-1	73-1	76-2	162-8	4,080-227
25141 4#/gal.	1 pt.	110-12	388-0	902-9	2,387-38	4,112-452
SD9098 2#/gal.	1 qt.	47-4	554-7	3,237-113	11,355-433	No leaves
Di Syston 6#/gal.	2/3 qt.	63-6	28-0	315-2	3,345-14	15,078-1,583
Thimet 10% gran.	2-2 1/2#	34-5	638-5 ^b	2,430-23	11,585-182	7,389-456
Thimet E.C. 4#/gal.	3/4 qt. ^c	61-7	1,238-5	206-0	3,149-13	17,356-535
13005 40% W. P.	1 1/4#	47-6	534-6	4,134-102	5,627-102	22,184-1,227
52160 4#/gal.	1 pt. ^d	90-2	1,908-8	13,178-178	35,100-438	No leaves
Check		139-15	945-5	3,872-41	11,947-87	12,058-758

*Spary dates alternate with counts at weekly intervals. c - Increased to 1#act./A on 2nd spray 7/27; 2 sprays total.

a - Apterous (wingless) - alate (winged).

b - Thimet granules give approximately 2 mo. control. d - Increased to 1# act./A on 7/27.

e - 1#act.DDT applied to prevent excessive damage by Colorado potato beetle on 8/4/64.

Greeley table 10. Results of chemical tests for control of the Colorado potato beetle. Greeley, Colorado, 1964.

Material	Date of Counts *			Total
	7/6	7/20	8/3	
13005	0-0 ^a	0-25	2-8	2-33
Bidrin	0-0	0-17	2-29	2-46
SD9129	2-0	2-23	4-23	8-46
25141	10-3	0-9	0-11	10-23
Thiodan 50% W. P.	0-0	13-23	29-45	42-68
SD9098	1-0	6-31	46-26	53-57
52160	0-0	12-44	42-28	54-72
Thimet 10% gran	2-0	4-32	56-36	62-68
Thimet E. C.	0-1	36-73	28-41	64-115
Thiodan miscible	27-1	11-38	37-65	75-104
Di Syston E. C.	34-0	9-29	58-52	101-81
Check	18-5	79-61	224-107	321-173

*By larval rank aLarva - adult.

ALASKA
C. H. Dearborn

Fourteen clones exhibiting some foliar resistance to frost were sent to cooperators in remote areas along the Kuskokwim and Yukon rivers. Ontario, a good producer in this northern region, served as a check variety. Two clones of Alaska 114 x 27-11, a seedling with S. acaule parentage, showed good frost resistance. Yields were not meaningful because of flooding of the test plots by high river waters after planting. Cooperators have become aware that some of these clones have considerable frost resistance and at the same time have good table quality. General frost had not occurred in the Matanuska Valley on October 7 when this year's crop was harvested. Thus a frost resistance evaluation of new seedlings was not obtained.

The IR-1 clone No. 5279-3 that shows scarcely any dormancy has been retained temporarily and is available to anyone.

Dr. Hoyman's seedling 48-1 that was so productive in 1963 yielded at less than half its previous rate and showed a uniform chlorotic mosaic pattern in all plants. Specific gravity 1.077 was very low for this environment.

From averages of 4 replicates of 30 varieties in trial, characteristics of 4 clones from the N. C. breeding program are shown in relation to performance of standard varieties grown in Alaska. Varieties, yield in hundredweight per acre and specific gravity are as follows: N.D. 4912-3, 258 cwt, 1.086; Neb. 4-65-9, 343, 1.079; Neb. 302-50-5, 269 cwt, 1.082; Neb. 412-55, 346, 1.083; Alaska 114, 322, 1.092; Green Mountain, 319, 1.097; Kennebec, 340, 1.090. Yields of 2 Nebraska clones were good but the specific gravity of all were lower than any variety or seedling in the 30 variety trial.

Perforated leaf condition, mentioned in last year's report, has been attributed to feeding injury caused by a large bodied, rapid moving green aphid. This aphid was also found on fireweed. Stunting and chlorosis of apical growing points accompanies leaf perforation but it is not clear if the abnormal growth condition will carry through the tubers and show up in next year's tops.

A double tuber condition has become conspicuous in Alaska during the past 5 years. It is manifested by two or more apical bud groups. They may modify tuber shape only slightly or they may cause two or more nearly identical tubers to develop from a single stolon attachment. Clones from North Dakota, Red Beauty and others appear to have been first to exhibit the abnormality. It has also been noted in Ontario.

ARIZONA
(Tucson)

N. F. Oebker and P. M. Bessey

Sixteen commercial varieties were evaluated in replicated plots in 1964 for fresh market use and chip manufacture. In addition, 33 varieties and advanced breeding lines were observed and evaluated in single-row plots. Also 12 selected USDA breeding lines were checked in 5-hill observation plots.

The test plots were located on the Hawes Ranch in eastern Maricopa County. Planting date was February 7, 1964. Plots of the replicated varieties consisted of 30 seed pieces spaced at 7 inches. Row spacing was 34 inches. Each plot was replicated 6 times. Fertilizer was applied at the rate of 1000 lbs./A of 16-48-0 banded 4 inches to each side and level with the base of the seed piece. Twenty lbs./A of 10% phorate (Dimet) was applied in one fertilizer band for psyllid and aphid control. The single-row observation plots consisted of 30 hills at the above spacing. Improper irrigation during part of the season was partial cause of low yields.

All plots were harvested on June 10, 1964. After grading, the potatoes were chipped. Yields and specific gravity of varieties are listed in Arizona tables 1 and 3. Chip yield and chip color are reported in Arizona tables 2 and 4. Chip yield is expressed in percent of weight of fresh peeled potatoes.

Of the red varieties in the replicated plots, LaRouge, Red LaSoda, Viking, and Red Pontiac all had about the same yields. Viking had the best appearance because of smoothness and uniformity in shape and size. Red Pontiac had the poorest appearance, much variation in size, and many small tubers. LaRouge had some rough looking tubers.

Kennebec and Merrimack continue to be top tuber yielders in the chipping varieties. As in the past trials, Merrimack produced the most chips. LaChipper also proved to be a good yielder of potatoes and chips.

In the single-row observation plots the following varieties looked promising and deserve further testing: red varieties--57431-5P, TL 8134, and 170-10P; russet varieties--Shoshoni and A 466-2; and white varieties--TL 8117, B2894-24, RD 46, 5814-1P, TL 7627, and 57322-4P. Red variety 177-6P produced a good yield but air cracks were a serious problem.

Observations on the USDA selections are recorded in Arizona table 5. Selections B 4808-8 and B 5011-12 gave the best performances.

Arizona table 1. Yield and specific gravity of potato varieties in replicated plots. 1964.

Variety	Seed Source (State)	Yield Per Acre		Culls	Specific Gravity ^{2/}
		Jumbo + "A" Size	"B" Size		
		Cwt.	Cwt.	Cwt.	Rating
Kennebec	Alas.	238 a <u>1/</u>	24	14	72
LaRouge	Wis.	227 a	19	6	68
Merrimack	Me.	217 ab	23	7	77
Red LaSoda	N.D.	212 abc	21	11	67
Viking	N.D.	208 abc	9	9	72
Kennebec	N.D.	207 abc	23	11	70

continued

Arizona table 1, continued.

Red Pontiac	N.D.	204	abc	30	18	63
Viking	N.D.	203	abc	11	5	71
Merrimack	Wis.	200	abc	19	13	76
LaChipper	Wis.	191	abcd	21	10	72
4524-7R	N.D.	169	bcde	30	7	66
Haig	Neb.	162	cdef	28	11	69
RD-8	Wis.	147	def	20	8	64
RD-36	Wis.	126	ef	21	14	76
Pungo	Me.	125	ef	30	10	67
Norland	N.D.	117	f	18	10	62

1/ Duncan's multiple range test: varieties covered by the same letter are not significantly different from each other.

2/ 1.0 omitted from all specific gravity ratings.

Arizona table 2. Chip yield and chip color of potato varieties from replicated plots. 1964.

Variety	Chip Yield	Chip 1/ Color	Variety	Chip Yield	Chip 1/ Color
	Pct.			Pct.	
Merrimack (Me.)	38.6	5.0	Red LaSoda	36.0	6.0
LaChipper	38.0	5.2	Kennebec (Alas.)	35.9	5.0
Merrimack (Wis.)	37.6	5.0	RD-8	35.7	5.0
RD-36	37.5	5.0	Haig	35.7	5.0
Viking	36.8	5.2	Pungo	35.4	5.0
Viking	36.7	6.2	Red Pontiac	35.2	6.0
4524-7R	36.2	6.0	LaRouge	35.1	6.0
Kennebec (N.D.)	36.0	5.0	Norland	34.7	5.0

1/ Caughlin chip color scale: 1 = white; 4 through 7 = desirable tan to brown; 10 = burned--dark brown.

Arizona table 3. Yield and specific gravity of potato varieties from single-row plots. 1964.

Variety	Seed Source (State)	"A" Size	Yield Per Acre	Culls	Specific Gravity
		Cwt.	"B" Size	Cwt.	Rating
			Cwt.		
<u>Red</u>					
177-6P	N.D.	250	37	7	74
57431-5P	N.D.	228	70	17	65
TL 8134	La.	218	40	21	67
170-10P	N.D.	217	63	14	79
ND 4524-7R	N.D.	192	51	3	64
TL 8133	La.	169	32	11	68
TL 8197	La.	113	35	7	68
TL 7935	La.	74	22	6	69

continued

Arizona table 3, continued.

Russet

Shoshoni (A175-7)	Ida.	220	23	3	63
A 466-2	Ida.	190	18	2	74
ND 4192-3	N.D.	173	13	9	73
B 4818-11	Me.	148	47	9	74
A 598-101	Ida.	112	39	15	70
Early Gem	Wis.	91	18	35	65

White

TL 8117	La.	256	21	27	69
B 2894-24	Me.	225	21	5	69
RD 46	Wis.	207	14	11	76
5814-1P	N.D.	206	29	5	77
TL 7627	La.	204	17	7	70
57322-4P	N.D.	197	36	8	74
5719-4P	N.D.	196	22	13	63
B 4828-4	Me.	190	20	7	63
RD 183-1	Wis.	174	18	5	67
A 503-42	Ida.	170	27	6	71
Delus	Me.	170	10	6	76
RD 188-15	Wis.	161	57	10	71
Superior	Wis.	151	10	0	75
Keswick	Me.	148	24	7	72
A 463-4	Ida.	147	50	21	73
WY 1122	Me.	143	60	11	73
White Rose	-	86	15	154	65
RD 296-18	Wis.	84	18	8	56
A 483-6	Ida.	66	42	18	73

1/ 1.0 omitted from all specific gravity ratings.

Arizona table 4. Chip yield and chip color of potato varieties from single-row plots. 1964.

Variety	Chip Yield Pct.	Chip 1/ Color	Variety	Chip Yield Pct.	Chip 1/ Color
<u>Red</u>			<u>White</u>		
170-10P	37.8	5.0	TL 8117	38.6	6.0
177-6P	37.1	6.0	RD 46	37.8	5.0
TL 8197	35.6	6.0	Delus	37.8	5.0
TL 8133	34.3	5.0	A 463-4	37.5	5.0
TL 7935	34.2	6.0	57322-4P	37.2	5.0
ND 4524-7R	34.2	6.0	WY 1122	37.0	5.0
57431-5P	34.0	6.0	5814-1P	36.6	5.0
TL 8134	33.9	6.0	Keswick	36.2	5.0
			RD 188-15	36.2	6.0
			A 483-6	35.9	6.0
			Superior	35.4	5.0
<u>Russet</u>					
A 466-2	37.6	5.0	B 2894-24	35.0	6.0
B 4818-11	37.2	5.0	TL 7627	35.0	6.0
ND 4192-3	36.6	8.0	A 503-42	34.6	7.0
A 598-101	36.2	6.0	RD 183-1	34.3	5.0
Shoshoni	36.0	6.0	RD 296-18	34.2	6.0
Early Gem	33.8	6.0	B 4828-4	33.4	8.0
			5719-4P	32.6	6.0

1/ Caughlin chip color scale: 1 = white; 4 through 7 = desirable tan to brown; 10 = burned--dark brown.

Arizona table 5. Yield and chip yield and chip color of potato selections from USDA breeding program in 5-hill plots. 1964.

Pedigree	Yield Per Plot			Culls	Chip Yield Pct.	Chip 1/ Color
	Jumbo Lb.	"A" Size Lb.	"B" Size Lb.			
B 4744-1	0	2.2	.1	.1	35.8	7.0
B 4744-2	0	2.0	.4	.2	31.8	9.0
B 4808-8	0	5.5	0	0	37.6	8.0
B 4808-16	1.0	1.9	.3	0	33.6	9.0
B 4829-3	0	1.3	.7	.7	33.4	9.0
B 4987-30	1.0	1.9	.5	.1	33.2	9.0
B 5006-4	0	4.2	.4	.2	31.4	9.0
B 5011-12	0	4.3	.9	.2	34.0	8.0
B 5012-8	0	1.2	.3	.1	32.8	9.0
B 5016-2	0	3.4	.2	.2	34.3	9.0
B 5023-17	0	4.0	.4	.4	34.3	9.0
B 5045-8	0	3.0	.8	.3	35.1	6.0

1/ Caughlin chip color scale: 1 = white; 4 through 7 = desirable tan to brown; 10 = burned--dark brown.

CALIFORNIA
Glen N. Davis

At Shafter 13 named varieties and 10 advanced generation seedlings were grown in a replicated yield test. The variety White Rose was used as the check. Two named varieties and four seedlings produced yields significantly higher than the check with Redskin being the highest. The data are presented in table 1.

Forty seedlings selected from single-hill plantings in 1963 were grown in 10-hill lots in 1964. Six were selected on the basis of horticultural characters, yield, and specific gravity to be included in the replicated tests in 1965. The data are presented in California table 2.

Thirty lines received from R. V. Akeley were tested for Verticillium wilt resistance by the "tooth pick" method reported by the Nebraska Agricultural Experiment Station and for resistance to common scab in the field at Shafter, California. The results are reported in California table 3. Four were resistant to both Verticillium and scab. None of the four are horticulturally what is wanted in California but they are potential resistant parents in the breeding program.

Approximately 5000 seedlings (from seed furnished by R. V. Akeley) were grown in single-hill plantings. Eighteen were selected for further testing in 1965.

California table 1. Potato yield test, Shafter, California, 1964^{1/}
(5 replications, 25 seed pieces per plot).

Kind	Mean Yield of 5 Reps	Specific ^{2/} Gravity
	Lb.	
White Rose (Check)	43.8	77
Snowflake	52.8	77
Redskin	64.0	75
Avon	47.8	82
Hunter	16.4	78
Superior	39.8	69
Rushmore	42.4	71
Ona	50.6	76
Fundy	24.8	74
Kennebec	64.4	85
Kennebec (Virus free from Alaska Exp.Sta.)	60.6	87
Huron (Mean of 2 reps.)	56.0	80
Tawa (Mean of 3 reps.)	32.7	75
36-234 (White Rose x Merrimack)	12.8	80
42-56 (White Rose xAc26031)	27.2	83
52-27 (Blanca x A180-25)	20.6	75
76-33 (A513-8 x Teton)	15.0	80
91-87 (White Rose x Merrimack)	61.2	84
91-201 (" " x ")	61.2	72
93-32 (" " x B3696-13)	55.4	74
93-150 (" " x ")	57.6	75
93-187 (" " x ")	32.2	75
A160-26	49.0	76
LSD 5%	9.7	
LSD 1%	12.9	

^{1/} Fertilizer: 600 lbs. per acre 16-20-0. For significance over check--White Rose, 5 replications--25 seed pieces per rep. ^{2/} 1.0 omitted from all specific gravity ratings. Entire plot including all seedlings--2 acres.

California table 2. Seedling yield test (10 Hills) Shafter, California, 1964.

Pedigree Number	Parents	Total Yield Lb.	Specific Gravity ^{1/}
91-353	White Rose x Merrimack	31.0	82
-357	" " x "	23.0	78
-381 ^{2/}	" " x "	53.5	76
-419	" " x "	28.0	80
-420	" " x "	24.0	75
100-300	Hanna x Redskin	28.0	70
-340	" x "	35.0	81
-369	" x "	10.0	74
-394	" x "	21.0	80
101-271 ^{2/}	" x Merrimack	27.0	93
-333	" x "	11.0	76
-532	" x "	20.0	79
118-279	Merrimack x B3696-13	35.0	81
-285	" x "	25.0	75
-321 ^{2/}	" x "	29.0	87
-425	" x "	33.0	82
-492	" x "	28.0	70
-547	" x "	20.0	75
-632	" x "	29.0	79
137-3 ^{2/}	White Rose x V21-43	28.0	87
138-6	" " x B4828-4	8.0	68
143-9 ^{2/}	Merrimack x "	52.0	84
148-16	X792-94 x "	40.0	79
148-17	" x "	21.0	78
149-153 ^{2/}	V21-43 x Merrimack	25.0	88
151-12	B3817-17 x "	23.0	85
153-11	" x V21-43	28.0	91
158-13	B4871-13 x "	25.0	73
-14	" x "	23.0	80
160-3	" x B4828-4	24.0	68
48-17	Merrimack x A180-26	19.0	78
100-303	Hanna x Redskin	30.0	
100-369A	" x "	11.0	
101-245	" x Merrimack	20.0	88
-435	" x "	20.0	78
148-18	X792-94 x B4828-4	12.0	
118-369	Merrimack x B3696-13	10.0	83
149-168	V21-43 x Merrimack	11.0	93

^{1/} 1.0 omitted from all specific gravity ratings.

^{2/} Saved for replicated test in 1965.

California table 3. Test for resistance to verticillium wilt and common scab, California, 1964.

Kind	Verticillium <u>1/</u>	Scab <u>2/</u>	Kind	Verticillium <u>1/</u>	Scab <u>2/</u>
B4809-7	R	S	B5090-11	R	S
B5006-6	S	S	B5052-14	R	S
B5000-18	R	S	B5031-18	S	S
B4846-2	S	S	B4830-19	R	S
B5088-7	S	S	B5132-3	R	R
B5012-8	S	S	B4777-53	S	S
B5066-3	S	S	B5089-17	R	R
B4744-23	R	S	B5030-10	R	S
B5036-40	R	S	B4845-4	R	S
B5006-15	R	S	B5019-7	R	S
B4987-34	R	R	B4846-4	R	S
B4795-3	S	S	B4986-15	R	S
B5141-6	R	S	B4808-3	R	S
B5011-17	R	S	B4824-4	R	S
B5063-3	R	R	B4808-19	R	S

1/ By "tooth pick" test

R Resistant

2/ Field test

S Susceptible

CANADA (Ontario)
G. R. Johnston and R. G. Rowberry

Ontario Regional Potato Adaptation and Variety Trials, 1964

In 1964 the Ontario regional potato trials were conducted at seven locations. The replicated regional variety trials were in standard, randomized blocks with 14 clonal entries, including the check varieties--Irish Cobbler, Kennebec and Sebago, and four replications. Tuber samples of each variety from each location were processed for culinary quality at 2 institutions: chip and french fry tests at the Processing Laboratory, C.D.A., Smithfield; and boiling and baking tests at the Potato Quality Laboratory, Horticulture Department, University of Guelph. In addition, limited tests of processing potential of advanced clones, in comparison to named varieties, were carried out in cooperation with Hostess Food Products Ltd., Preston, and the Agricultural Research Department, Campbell Soup Company Ltd., Brampton.

Adaptation trials were conducted in 1964 at six locations in Ontario. These trials were in single-row plots, varying in size from one hill for unselected, second generation clones and preselected, third generation clones, to 30-hills for a few advanced clones. Some of the more advanced clones in adaptation trial were also included in a replicated "dates of harvest" trial at some co-operating stations. Three stations conducted adaptation trials of the Fredericton-bred unselected or preselected potato seedlings in single-hill plots. These were Preston, Simcoe and Bradford. Culinary tests were conducted on number of the more advanced adaptation trial clones.

Chipping and french frying were done (1) after storing tubers 6-8 weeks at 55° F. and (2) after storing tubers 4 weeks at 40° F. followed by 2 weeks' reconditioning at 70° F.

Scoring system for finished chips:

90 = uniform, light golden-white
85 = uniform, golden
80 = fairly uniform, deep golden
75 = fairly uniform, brown-golden
70 = medium brown
65 = dark brown

Scoring system for finished french fries:

Internal Texture	50	very mealy, dry	External Appearance	40	no wrinkling,
	40				flabbiness, un-
	30				evenness or dulling
	20			30	
	10			20	
	0	very soggy, mushy		10	
				0	very wrinkled, con-
					cave, flabby, uneven
					or dull
Internal Color	10	white			
	0	grey, creamy, transparent or dark			

KEY TO THE RATINGS USED IN ALL TABLES FOR VINE, TUBER AND CULINARY CHARACTERISTICS

<u>Maturity (Vines)</u>	<u>Type</u>	<u>Plant Vigor</u>	<u>Appearance</u>	<u>Eye Depth</u>
1 - very early	1 - round	5 - very weak	4 - poor	1 - shallow
2 - early	2 - oval	4 - weak	3 - fair	2 - medium
3 - medium	3 - oblong	3 - moderate	2 - good	3 - deep
4 - late	4 - long	2 - strong	1 - excellent	
5 - very late		1 - very strong		

<u>Skin Type</u>	<u>Yielding Ability</u>	<u>Type of Scab</u>
1 - smooth	3 - low	1 - small, superficial pustules
2 - flaked	2 - medium	2 - larger, superficial
3 - netted	1 - high	3 - large, rough or corky
		4 - small, shallow pits
		5 - large, deep pits

Culinary Ratings

<u>Boiled</u>	<u>Texture</u>	<u>Baked</u>
40	Very mealy	45
0	Very soggy	0
	<u>Color</u>	
30	Uniformly white, creamy or yellow	30
0	Overall darkening or severe stem-end darkening	0
	<u>Flavor and Aroma</u>	
20	Pleasant, mild, natural	25
	Unpleasant, strong, off-flavor	0
	<u>Sloughing</u>	
10	none	not
0	severe	<u>rated</u>
100		100

Ontario table 1. The tuber sizing and specific gravity readings for 15 potato clones, harvested at 3 intervals at C.R.S., Preston, 1964.

Variety	Vine Maturity	Harvest Dates ^{1/}								
		July 27			August 10			August 31		
		A	B	C	A	B	C	A	B	C
Norgleam	VE	3.8	234	65	4.4	317	69	4.8	351	69
G581-78	VE	4.8	282	66	5.6	383	67	6.3	449	73
G592-39 Ru	VE	6.1	210	70	6.8	260	75	6.5	263	75
G581-25	VE	3.8	258	61	5.6	353	65	5.8	420	68
Cobbler	E	4.4	185	68	6.6	333	76	6.8	498	80
G581-80	E	6.2	282	65	7.2	371	66	8.2	508	76
ND3022-18	ME	4.4	204	70	4.8	298	70	5.8	461	77
MS425-2L	ME	6.2	242	62	6.4	308	68	7.8	529	75
G597-17	M	4.0	210	72	4.6	314	83	5.0	445	84
FG3524-2	M	4.4	193	61	5.8	335	70	7.0	477	76
B5132-9	M	3.6	149	57	4.8	281	67	5.6	467	69

continued

Ontario table 1, continued.

Variety	Vine Maturity	Harvest Dates ^{1/}								
		July 27			August 10			August 31		
		A	B	C	A	B	C	A	B	C
Kennebec	ML	3.6	145	54	5.0	389	62	5.8	498	71
B4878-7	ML	3.6	170	58	3.9	213	66	4.3	330	69
P101-2R	L	3.8	221	58	4.4	260	65	5.8	504	66
Sebago	VL	4.2	141	51	5.4	238	60	6.4	474	73
Variety means		4.5	208	62	5.4	306	69	6.1	445	73

^{1/} A = mean number of tubers per hill, 1 7/8 inches and over.

B = mean yield of tubers, 1 7/8 inches and over, in cwt per acre.

C = mean specific gravity readings.

^{2/} 1.0 omitted from all specific gravity ratings.

Ontario table 2. Potato variety or seedling performance notes, 1964. Adaptation trial planted May 13-15, harvested October 2-9 at Preston, 1964.

Variety or Seedling	Vines		Tuber Characteristics					1/ Specific Gravity	REMARKS
	Maturity	Plant Vigor	Type	Appearance	Skin Type	Eyes-Depth			
P5302-3Ru	3	2½	3	2½	3	1	2	73	Uniform tubers with exc.net but occasional growth crack and some harvest cracks. Good boiler.
P5814-1	2½	2½	3	2	1	1	1	74	Oblong to long type. Generally smooth and uniform. V.early sizing. 5% type 2 scab. 15% si. sc. Good boiler.
P164-4Ru	2	2½	3	3	3	1	1	67	A few irreg.tubers but much more uniform, than Netted Gem.
P97-19Ru	2	2½	4	2½	3	1	1½	70	Dark brown skin with a very good net. Some tubers rough and irreg; some very smooth. V. good boiler--exc. color.
T461-1	2½	2	1	1	1	2	1	68	Generally unif.and attract. Scab free. 10% si.sc. Exc.boiler,very white and mod.mealy at 1.068 S.G.
Early Gem	2½	2½	4	3	3	1	2	71	Skin has good net. Some tubers irreg.shape. A few growth cracks. Very good boiler.
Netted Gem	4	2½	4	3	3	1	1	89	Check variety for netted types. Many irreg.,elongated tubers. Quite rough and knobby. Too mealy for a boiler-sloughed badly.
Marygold	3	2½	1	3	1	2	1	72	Somewhat irreg.and Cobblerish in shape. Yellow skin. Boils creamy-yellow.
Penobscot	3½	2½	1	3	1	2	1½	87	Irreg. in shape. Blocky. Clean. Reported by USDA to be highly res. to leafroll and immune to mosaic mottle. Boils v.mealy & sloughs.
Majestic	4	2	3	4	1	1	2½	88	Elongated, somewhat rough tubers. 15% ty. 2 scab.
B4744-23	2	3	1	2½	1	2	2	85	Fairly unif.tubers. 15% russet scab. Exc.boiling quality. USDA reports it res. to X,A and vert. wilt.
B4986-15y	2½	2½	1	2½	2	2	2½	80	Patchy netting or flaking gives tubers scurfy appear. Unif. shape.
B5019-6	2	3	3	2	2	1	2	78	Mostly uniform but some rough. USDA reports it highly res.to V.W. and res.to golden nematode. Very good boiler.
B5236-21	2½	2½	1	2	1	2	1½	74	Fairly unif.tubers with bright skin and almost free of Si.sc.
B4987-34	2½	2	1	2	2	1	2	84	Appears to be early sizing. V.good boiler with exc. color. Fairly unif.tubers with clean,tan-colored skin. Quite res.to Ssc. Stolons tend to adhere a little. Pink eyes.USDA reports it res. to scab, Vw, X and A. Very good boiler.
B5006-6	2	2½	3	3	1	1	1	69	High set but irreg.shape. Fairly good boiler. USDA reports very high res. to Vw. and Lr.

continued

Ontario table 2, continued.

B5132-3	3	3	1	2	2	2	1	70	Fairly unif., roundish tubers. 5% ty. 2 scab. Reported by USDA to be res. to X,A and Vw. Good boiler.
B5141-6	3	2	1	2½	1	1½	1½	94	USDA reports res. to scab,A, and late bl. Good yield of fairly smooth, clean tubers. Tubers are sl. flattened. Tendency to sprout a little in storage by end of Dec. Good boiler except sl. stem-end darkening but no sloughing--very dry. Low reducing sugar pot. Fairly good appearance. A few hollow hearts. Free of skin defects. Very good boiler--exc. color.
B5147-12	3½	2½	1	2½	2	2	2	70	Sl. irreg. in shape. Pink skin. USDA reports res. to green. scab, Vw., Lr,A and Y. Too mealy and too much sloughing for a boiler, Exc. baker. May be a chipper from 53° storage. Some tuber rhizoc.
B5063-3R	3	2½	1	3	1	2	1½	90	V. smooth and unif. Deep red skin. Free of skin defects. Color doesn't fade in storage. Fairly good boiler. Some stem-end darkening.
ND4524-7R	2½	2	1	1	2	1½	1	68	V. smooth and unif. Med. red skin. 25% Ssc. but is somewhat masked by flaky skin. Occ. growth crack and internal necrosis. Good boiler.
P177-13R	3	2½	1	1	2	1½	1	70	

1/ 1.0 omitted from all specific gravity ratings.

Ontario table 3. Ontario regional potato trials, 1964. Summary of yields and specific gravities.

Variety	Yields in cwt/acre, 2½-3½ inches						Specific gravity readings ^{2/}									
	Ha ^{1/}	Si	Pr	Br	Sm	Ot	Fw	Means	Ha	Si	Pr	Br	Sm	Ot	Fw	Means
Cobbler	19	166	369	310	139	110	324	205 ⁷	73	74	81	62	73	75	76	73 ⁶
Viking	37	143	335	312	268	30	304	208 ⁸	72	67	74	61	74	63	71	69 ¹³
I 803-1	24	230	266	222	158	108	307	188 ¹⁰	73	78	75	69	66	70	76	72 ⁸
Superior	33	159	314	307	127	126	375	206 ⁶	75	74	74	64	68	70	79	72 ⁸
Reliance	79	239	188	274	158	140	321	200 ⁹	70	71	62	58	65	70	67	66 ¹⁴
F5649	27	202	385	294	173	121	284	214 ³	80	84	86	77	79	73	88	81 ²
Norgold Russet	23	186	188	265	96	120	317	171 ¹³	73	76	68	63	59	71	78	70 ¹²
G597-20	43	224	244	294	153	92	284	188 ¹⁰	80	84	69	77	82	78	84	79 ⁴
Kennebec	43	307	445	313	234	104	421	267 ¹	71	73	79	69	75	71	76	73 ⁶
F5247	26	280	294	256	197	121	310	212 ⁵	79	79	86	72	81	77	71	78 ⁵
F5552	2	208	233	149	174	99	313	168 ¹⁴	66	68	85	63	79	72	73	72 ⁸
F5561	21	258	194	246	168	101	302	186 ¹²	87	84	92	70	88	77	91	84 ¹
I 1111-10	31	298	349	212	219	113	325	221 ²	78	84	86	71	83	76	86	81 ²
Sebago	13	240	374	202	277	82	307	213 ⁴	70	73	80	63	81	71	65	72 ⁸
Means	30	224	298	261	182	90	321	202	75	76	78	67	75	72	77	74

^{1/} Ha--Harrow; Si--Simcoe Sta.; Pr--Preston; Br--Bradford; Sm--Smithfield; Ot--Ottawa; FW--Fort William.

^{2/} 1.0 omitted from all specific gravity ratings.

A discussion of some of the pertinent characteristics of the 11 entries in the regional variety trial in comparison to the standards--Irish Cobbler, Kennebec and Sebago follows:

Discussion of Entries

Viking. Second year regionally. Vines mature with Cobbler and the tubers generally size as early (later at Ft. William). Stand is usually good. Moderately strong vines. Roundish tubers. Set is not heavy and oversize was encountered at a few locations. Bright, medium-red skin. Shallow eyes. Oversize tubers often tend to become rough. Equal in yield to Cobbler in general but a little lower in specific gravity. Very white raw flesh. Excellent boiling and baking color but generally not mealy enough for a good baker. Not suitable as either a chipper or french frier. Stores well. Moderately susceptible to silver scurf. Small amounts of type 2 or 3 scab sometimes present; also rhizoctonia. Harvest cracks and an occasional growth crack reported at a couple of stations. Hollow heart prevalent at the Ottawa location. Viking's importance would appear to be as an early. It is attractive when washed and in most locations sizes earlier than Norland. Viking is quite drought tolerant. Re-test for a third year.

I 803-1. 1st year regionally. Medium maturing vines. Tubers size a little later than Cobbler. Stand was fair to good--only 67% at Preston. Roundish, bright, moderately flattened, smooth-skinned tubers with shallow eyes. Few tuber defects reported. A good set of tubers but undersize reported from locations where it was quite dry. About equal in yield to Cobbler and similar in specific gravity. Almost equal to Sebago as boiler but only a fair baker because of not being mealy enough. Fair to poor chipper and french frier. Stores well. Moderately susceptible to silver scurf. Resistant to scab. It is doubtful if I 803-1 merits further trial regionally.

Superior. 1st year regionally. Vines mature almost as early as Cobbler and tubers size just as early. Stand was very good except for one replication at Preston. Tubers are generally blocky, somewhat Cobblerish in shape with a flaky, tan-colored skin and medium-deep eyes. Except for some harvest cracks at Ottawa and Fort William, very few tuber physiological defects were reported. Because of the skin type, there was a tendency for the soil to adhere to the tubers at harvest. The tuber set is about the same as Cobbler as is the yield and specific gravity. Superior is equal to Cobbler as a boiler but not as mealy as a baker. Equal to Kennebec as a chipper both out of 53⁰ storage and after two weeks of reconditioning following 40⁰ storage. Except at Simcoe and Fort William, not equal to Kennebec as a french frier from either storage temperature; also its shape is not too suitable for cutting into french fries. Only Harrow reported much silver scurf. At Bradford, tuber rhizoctonia was a problem. Almost scab-free at all stations. Fort William reported a trace of tuber late blight. Stores very well. Rated as very attractive for the basket trade at Simcoe. Favorable comments on Superior from several other locations. Should be repeated regionally in 1965.

Reliance. 1st year regionally. Vines mature a little later than Cobbler but tubers size earlier. The stand was good at all locations except Preston where it was poor (36%). Tubers are roundish, somewhat irregular in shape, with a tan-colored skin that varies from flaked to moderately netted. Eyes are shallow. Four stations reported the prevalence of harvest cracks and at Preston there were a number of pointed and knobby tubers. The set and yield of tubers of Reliance was equal to Cobbler but the specific gravity averaged seven points lower. Reliance was rated the poorest

boiler and baker in the regional trials--chief complaints were sogginess and after-cooking discoloration. It was also generally rated inferior to Kennebec as a chipper and a french frier from both storage temperatures. Fairly susceptible to silver scurf, although the skin type helps to mask this skin disease. It ranged from scab-free at Simcoe and Fort William to 10% of type 2 scab at Preston. Tuber rhizoctonia was serious at Bradford. Reliance does not appear to merit further trial regionally.

F5649. 3rd year regionally. Mid-season vine maturity. Tubers size with Kennebec. Excellent stand. Tubers are oblong, smooth with a flaky, tan-colored skin and shallow eyes. Only a few tuber defects reported--some pointed at Bradford, some harvest cracking at Ottawa and Bradford, and some hollow heart at Smithfield. The tuber set was good. Yields were equal to Sebago but lower than Kennebec. The specific gravity readings averaged eight points higher than Kennebec and were the highest in the trial. It was equal to Sebago as a boiler in terms of the average scores and superior to both Kennebec and Sebago as a baker. However, as a boiler, there was considerable sloughing and a little after-cooking, stem-end darkening at a couple of locations. F5649 was not equal to Kennebec as a chipper nor as a french frier in spite of its better specific gravity. Silver scurf, when present, was effectively masked by the flaky skin. Only Fort William reported any scab. A moderate amount of tuber rhizoctonia occurred at Bradford and Smithfield. F5649 stores very well. This seedling has now had three years regionally. It should be either further tested in zonal trials or discarded altogether. The latter is recommended by the co-ordinator.

Norgold Russet (formerly ND4192-3Ru). 1st year regionally. Vines mature about the same time as Cobbler but the tubers size a little later. The stand was good at most locations. One replication at Preston had a very poor stand. Tubers are oblong to long, generally smooth in shape, although some stations reported some rough, off-type ones. The eyes are shallow. The skin is attractively, uniformly netted. Norgold Russet does not produce nearly as many unmarketable, off-type, knobby tubers as does Netted Gem. Some harvest cracking reported at Bradford and Ottawa and much hollow heart at the latter location. The tubers didn't size well at some locations and yields were down. Lower yielding than Cobbler and a little lower in specific gravity. Equal to Sebago as a boiler; would have been a better baker at some locations if it had been mealier. Cooks very white, with excellent flavor and aroma. Inferior to Kennebec as a chipper and french frier. Stores very well. Skin defects are very minor. Silver scurf, if present, is effectively masked by the netting. Almost scab-free at all locations. Norgold Russet was quite impressive at Fort William--good yield, early, attractive, very good cooking quality. With a source of virus-free, foundation class seed available for 1965, Norgold Russet should be repeated regionally.

G597-20. 1st year regionally. Vines mature with Kennebec or slightly earlier. Tubers size as early, if not earlier, than Cobbler. The stand was good to very good except at Preston (60%). The tubers are roundish to blocky in shape and a little Cobblerish, especially if oversizing occurs. Several stations reported a fair amount of rough shape. The skin varies from smooth to slightly flaked. The apical eyes are medium deep. Some tuber defects were reported--hollow heart at Preston, Smithfield and Ottawa; some growth cracks at Smithfield; tendency to stem-end, dry rot at Fort William; and a few late blight tuber lesions at Preston. The 1964 yields of G597-20 were a little lower than Cobbler. The specific gravity readings average about 6 points higher than any of the standards used for comparison. The specific gravity is relatively high early in the season which makes for a mealy product in an early-harvested variety. This is rather uncommon. (See the cooperative Campbell Soup Company report). G597-20 was relatively scab-free at most locations but silver scurf was quite noticeable at 3 of

the seven. Rhizoctonia on the tubers was quite noticeable at Bradford. G597-20 was rated the best overall boiler in the trial and the second best baker. It is quite mealy and tends to slough when boiled. Its mealiness score kept its rating high as a boiler. It is more suitable for the mashed product rather than boiled "whole." Equal to Kennebec as a chipper from 53° storage but not from 40° plus reconditioning. Not equal to Kennebec as a french frier at most locations and the shape is not suitable for cutting. It is recommended that further trials with G597-20 be of the "processing" type in cooperation with commercial concerns.

F5247. 3rd year regionally. Similar in vine maturity to Kennebec; also in sizing of the tubers. Vigorous vines. Tubers are generally roundish but often irregular in type with a tendency to pointed.

The skin varies from smooth to flaked to slightly netted depending on the location. Eyes are shallow. The stand was good. The tubers are borne on medium-long stolons which resulted in some sunburning. Harvest cracks and knobiness were reported at some stations as well as some tuber second growth as sprouts and sprout tubers. The set and yields were equal to Sebago. The specific gravity readings averaged about five points better than the three standards. Not equal to Sebago as a boiler--some stem-end, after-cooking darkening and some sloughing. Rated equal to Cobbler as a baker. About equal to Kennebec as a chipper and as a french frier out of 40° storage plus reconditioning. Tuber shape is not too suitable for french fry cutting. Tendency to sprout in storage unless temperature is controlled at 40°. Tuber samples from all stations exhibited moderate to severe silver scurf. Two stations reported some type 2, 3 and 4 scab. After 3 years of trial regionally, it is doubtful if F5247 merits further trial.

F5552. 1st year regionally. Vines mature between Kennebec and Sebago. Tubers size relatively late. Vigorous vines. Stand was good. Tubers were mainly irregular in shape with shallow eyes. The skin was generally flaky with pink eyes and pink blotches around the eyes. All stations except Bradford reported tuber defects such as pear-shape, pointers, elongated type, and second growth in the soil as sprouts and secondary sprout tubers. Early sprouting in storage was very common. The set was good but poor sizing at several locations kept the average yield down--the lowest in the trial. The specific gravity was about the same as Kennebec and Sebago. As a boiler, stem-end darkening and sloughing were common. The baking scores ranged from poor to fairly good. Not suitable as a french frier. It was interesting to note that from 53° storage that F5552 was consistently better than Kennebec as a chipper and equal to it from 40° storage after reconditioning. However, with so many shortcomings it is doubtful that its superior chipping quality from 50° storage, warrants any further testing of F5552 regionally.

F5561. 1st year regionally. Vine maturity between Kennebec and Sebago. Tubers size relatively late. Vigorous vines. Good stand. Tubers are generally irregular in shape and often somewhat rough, although Bradford and Smithfield reported good tuber shape. Eyes shallow. Skin quite flaked. Pink eyes and pink blotches around eyes. Four stations reported second growth as sprouts and secondary sprout tubers. The Bradford sample sprouted early in storage. Tendency for stolons to adhere. Moderate set of tubers. Didn't size well at some locations. Considerably lower yield than Kennebec but 10 points higher in specific gravity on the average (1.084 average was highest in the trial). Drier than Sebago when boiled and baked yet very little sloughing. However, three stations reported after-cooking, stem-end

darkening. Higher ratings than Kennebec as a chipper from 53° storage and equal to it following 40° storage and reconditioning for 2 weeks at 70°. Also the highest french fry ratings from 53° but not equal to Kennebec in this regard from 40° and reconditioning. The shape of the tubers are not too suitable for cutting for french fries. Four stations reported moderate to severe silver scurf but the flaky skin tends to mask it to some extent. At Bradford 15% tuber rhizoctonia reported. Only a trace of scab found on samples. Due to its superior specific gravity readings and chipping quality, F5561 should be repeated regionally for another year.

I 1111-10. 2nd year regionally. Vines mature before Sebago. Tubers size later than Kennebec. Vigorous vines. Good stand. Roundish, smooth tubers that are distinctly flattened. Shallow eyes. Smooth, bright skin. Most stations reported some growth cracks; some reported prevalent hollow heart and harvest cracking. The set is usually above average. Yields were second only to Kennebec and the average specific gravity was the second highest in the trial (1.081). Equal to Sebago as a boiler and better as a baker. Not quite equal to Kennebec as a chipper nor as a french frier. The shape is not good for cutting into french fry strips--too flattened. All stations reported varying amounts of silver scurf; four reported considerable tuber rhizoctonia and a couple found small amounts of type 2 scab. Because of consistent trouble with growth cracks and a somewhat undesirable shape coupled with silver scurf and harvest cracking in '64, it is doubtful if I 1111-10 is worthy of further trial regionally.

CONNECTICUT
Arthur Hawkins

Varieties. Potato variety tests were conducted by the Storrs Agricultural Experiment Station, Storrs, Connecticut, in 1964 on commercial potato farms in the Connecticut River Valley. The location at Farm N, Connecticut, Table 2, was selected to test verticillium wilt effect on varieties. Seed was supplied through the cooperation of the USDA National Potato-Breeding Program from Presque Isle, Maine.

Experimental procedures, total yields, yields over 1-7/8", yields over 1-7/8" with seriously off-shaped tubers removed, tuber defects, dry matter, and chip color are given in Connecticut tables 1 and 2.

Yields. Irrigation was required at both locations during early July through August. The unusually cool temperatures in August favored the northern strain of verticillium wilt, especially at the highly infested location on Farm N.

At Farm GF, Connecticut table 1, where verticillium wilt was not a problem, Kennebec produced the highest marketable yield. LaRouge, LaSoda, and Viking yielded slightly more than Katahdin. Snowflake, Ona, Alaska, Arenac, and Penn Chip produced poorer yields; the other varieties produced about the same as Katahdin.

At Farm N, where verticillium wilt infestation resulted in early death of susceptible varieties, the resistant variety Ona outyielded all others. Viking, Alaska, and LaRouge, followed by Kennebec, produced slightly less than Katahdin. The lowest yields were obtained with Snowflake, Penobscot, and Arenac.

The high percentage of tubers under 1-7/8" for Ona and Russet Norgold, at both farms, indicates that the seed of these varieties and some of the other newer varieties, may need to be spaced greater than 9" apart.

Specific gravity. At Farm GF, table 1, Penobscot had the highest specific gravity followed by Arenac, Kennebec, Katahdin, Ona, Pungo, and Alaska.

Chip color. After grading the potatoes were stored at 50° F. until the second week of January, at which time the storage temperature was raised to 70° F. for 3 weeks before chipping.

Potatoes at Farm GF were harvested before freezing soil temperatures. Kennebec and Pennchip produced the lightest colored chips; followed by Ona, Katahdin, Arenac, Penobscot, and LaChipper in that order.

Potatoes from Farm N were not harvested until 3 days after the soil had been subjected to freezing temperatures at the surface. Nevertheless, Pennchip, Kennebec, and Penobscot reconditioned to produce light colored chips; LaChipper and Alaska produced chips of satisfactory color.

Connecticut table 1. Yield,^{1/} specific gravity, and chip color of potato varieties and seedlings at Farm GF, East Windsor Hill, Connecticut, 1964.^{2/}

Variety or <u>3/</u> Seedling (Spacing 9" except *)	Total Yield Per Acre	<u>Yield Per Acre, Over 1 7/8"</u>				Free of Serious Off shape <u>4/</u>	Specific Gravity <u>5/</u>	Chip <u>6/</u> Color
	Cwt.	Pct.	Cwt.	Pct.	Cwt.			
Alaska	270	79	214	79	214	72	7.2	
Arenac	237	84	199	80	191	79	6.3	
<u>Katahdin</u>	<u>315</u>	<u>91</u>	<u>287</u>	<u>91</u>	<u>286</u>	<u>78</u>	<u>6.3</u>	
Kennebec (8")*	445	96	428	90	402	78	5.3	
LaChipper	304	84	255	83	251	78	6.9	
LaRouge-Red **	378	92	346	85	322	67	8.1	
LaSoda-Pink **	357	92	330	88	313	67	8.4	
Ona	272	82	223	79	215	75	6.0	
Pennchip	230	84	194	83	191	70	5.5	
Penobscot	323	93	301	90	292	92	6.6	
Pungo	366	93	340	87	320	74	7.6	
Snowflake	244	89	218	89	216	69	8.1	
Viking-Red **	360	94	340	91	326	70	8.3	
Russet Norgold	317	86	272	85	270	69	9.0	
B4123-10	351	83	293	81	285	64	7.9	
WY 1122	301	94	283	94	282	66	7.5	
LSD .05					80.4			
.01					108			

- 1/ Plots: 1 row 21 ft. long. Replication: 4 in randomized blocks (4 sections x 4 rows)
Soil: Enfield silt loam previously in potatoes 2 years. Fertilizer: 1500 lbs.
8-10-10-2 in sidebands, plus 60 lbs. N side-dressed.
- 2/ Season and Conditions: E. Windsor Hill, 10 miles N.E. of Hartford, Conn. Planted:
May 15. Very dry season; irrigation applied in July and August. Coolest August on
record favored northern strain of verticillium wilt. Heavy aphid population finish-
ing crop at date of killing frost 9/17/64: B4123-10 already dead; LaChipper 1%,
green Viking 5%, others 20 to 30% green; Ona, Alaska, and Wyl122 50% green.
- 3/ Seed from A. E. Schark, USDA, Presque Isle, Maine. Cut seed (1½ to 2 oz.) spaced
9", except Kennebec at 8 inches.
- 4/ Tuber observations on 20 tubers (2 reps x 10 tubers). Hollow-heart: Katahdin = none
(0/20); LaChipper = 1 in 20 (1/20); LaRouge = 1/20; LaSoda = 1/20; Ona = 5/20; Penn-
chip = 8/20; Pungo = 7/20; Norgold = 3/20; B 4123-10 = 7/20; WY 1122 = 4/20. Stem-
end and vascular discoloration: Katahdin 10/20 and 6/20 respectively; Viking and
Kennebec less than Kat.; LaRouge, WY 1122 and especially Alaska, Ona, Snowflake and
Pungo more than Katahdin; others about same as Katahdin, except B 4123-10 clear,
0/20, 0/20.
- 5/ Specific gravity calculated by weight in air and in water, ave. of 4 replications
(12-15 tubers 2½" to 3" diam. per sample). 1.0 omitted from all specific gravity
ratings.
- 6/ Harvested 10/6/64. Farm storage (45-50°F) until graded 11/24/64; then stored 50-55°F.
Spec.Gr. run Dec. 18, 1964. Storage temp. raised to 70°F Jan. 11; chipped, 2/1/65. Chip
color ave. of 2 samples, each 10 tubers from 2nd and 3rd blocks. Proposed Color
Reference Standard Proctor and Gamble Co. Chips with readings 6.0 and 7.0 satis-
factory; higher the reading the darker the chip.
** -- Skin colors, others white.

Connecticut table 2. ^{1/}Yield, specific gravity, and chip color of potato varieties and seedlings at Farm N, Windsorville, Connecticut, 1964. ^{2/}--Verticillium wilt infestation high.

Variety or ^{3/} Seedling (Spacing 9" except *)	Total Yield Per Acre	Yield Per Acre, Over 1 7/8"				Specific Gravity ^{5/}	Chip ^{6/} Color
		Free of Serious Off shape ^{4/}					
		Cwt.	Pct.	Cwt.	Pct.		
Alaska	293	89.8	263	89.5	262	70	7.5
Arenac	216	81.0	175	73.0	158	74	8.1
Katahdin	<u>251</u>	<u>93.4</u>	<u>234</u>	<u>93.4</u>	<u>234</u>	<u>62</u>	<u>8.1</u>
Kennebec (8")*	246	93.3	230	91.1	224	65	6.1
LaChipper	247	88.2	218	88.2	218	65	7.3
LaRouge-Red**	309	90.0	278	82.0	253	67	9.0
LaSoda-Pink**	248	88.2	219	75.2	187	62	8.6
Ona	349	91.3	319	88.3	308	71	8.9
Pennchip	243	83.9	204	83.9	204	64	5.9
Penobscot	161	83.5	134	83.5	134	83	6.2
Mohawk	242	92.2	223	90.8	220	73	8.1
Snowflake	174	85.7	149	85.7	149	64	8.9
Viking-Red**	325	97.3	316	85.3	277	67	9.2
Russet Norgold	238	83.1	198	80.1	191	58	8.7
4828-4	252	84.1	212	82.0	207	58	9.6
LSD .05					69		

^{1/} Plots: 1 row 12 ft. Replication: 3 in randomized blocks (2 sections x 4 rows) except only 2 replications of LaSoda and Pennchip. Soil: Enfield silt loam, 4th year in potatoes, previously tobacco. Fertilizer: 2000 (6-10-10-2 in side bands, 50 lbs. N plow down and 30 lbs. N sidedressed.

^{2/} Season and Conditions: Windsorville, 10 miles N.E. of Hartford, Conn. Planted: May 20. Very dry season; irrigation applied July and August. Coolest August on record, favored northern strain of verticillium wilt, resulted in early dying.

^{3/} Seed from A. E. Schark, USDA, Presque Isle, Maine. Cut seed (1½ to 2 oz.) spaced 9 inches, except Kennebec at 8 inches.

^{4/} Tuber observations on 20 tubers (2 reps x 10 tubers); Note: early death by verticillium wilt. Hollow-heart: Kat = 6 of 20 (6/20); Alaska, LaRouge, LaSoda, Penobscot, Mohawk, Snowflake, Viking, Russet Norgold and 4824-4 all none, 0/20; Kennebec 1/20; Arenac and Ona 3/20; LaChipper 4/20 and Pennchip 11/20.

^{5/} See footnote 5/ Connecticut table 1.

^{6/} Harvested: 10/8/64, 3rd day of subfreezing temperatures. Stored 45-50° until graded 11/25/64 then 50-55°. Specific Gravity run 12/21/64. Storage temperature raised to 70° January 11; chipped 2/2/65. Chip color ave. of 2 samples, each 10 tubers from second and third blocks. Proposed Color Reference Standard Proctor & Gamble Co. Chips with readings 6.0 and 7.0 satisfactory; higher the reading the darker the chip.

** -- Skin colors, others white.

DELAWARE
E. P. Brasher

Seventeen varieties and seedlings were tested in 1964 for productivity and solids. The experimental conditions and procedure were as follows: soil, Norfolk sandy loam; plot design, randomized block; replications, four; plot size, 3 by 24 feet; spacing in row, eight inches; fertility, 2000 pounds of 10-10-10 per acre in bands at planting time; irrigation, when soil moisture dropped to 50 per cent available; fungicide, Zineb; insecticides, DDT and Sevin. The results are shown in Delaware table 1.

Delaware table 1. Yield and solids tests of varieties and seedlings, Georgetown, Delaware, 1964.

Variety or Seedling	Yield Per Acre		U. S. No. 1 Pct.	Total Pct.
	U. S. No. 1 Cwt.	Total Cwt.		
Kennebec	297	342	87	16.0
Haig	251	330	76	15.7
Delus	250	283	88	17.0
Penobscot	241	307	79	17.7
B4828-4	228	323	71	15.2
Katahdin	216	289	75	16.0
B4269-16	212	258	82	14.3
Viking	200	216	93	14.5
B3876-25	198	271	73	18.2
Catoosa	198	277	71	16.0
N. D. 4192-3	197	292	67	15.2
B3725-1	192	253	76	16.5
B4523-8	191	266	72	14.5
Houma	184	265	69	16.9
Pungo	158	223	71	18.7
Pennchip	108	204	53	17.9
W. Va. 48-39	82	154	53	16.7
L.S.D. 5% level	44	44	--	0.7
L.S.D. 1% level	58	60	--	1.0

FLORIDA

Potato Variety and Seedling Selection Trial at Hastings, Florida in 1964 E. N. McCubbin -----

Nineteen potato varieties and 9 seedling selections were grown and compared in a replicated yield trial at the Potato Investigations Laboratory at Hastings, Florida in 1964. Seed stocks were obtained mostly from the USDA Potato Breeding Program at Presque Isle, Maine and Baton Rouge, Louisiana. Seed of a few stocks were secured from Wise Potato Chip Company, Berwick, Pennsylvania and Ben Picha, Grand Forks, North Dakota.

Experimental. Location, Hastings, Florida; soil, recently cleared Rutledge fine sand; plot size, single rows 13-feet long and 40 inches apart; seed size, 1.5 to 2 ounces; seed spacing, 12 inches; plot design, randomized block; replication, five; planting date, February 21, 1964; fertilizer, 2300 pounds 6-8-8 per acre in bands; fungicide, Maneb; insecticide, Parathion; harvest date, May 27, 1964--95 days after planting.

Results. One seedling, B721-29, and two varieties, LaRogue and Ona, outyielded Sebago in US1A and US1B tubers, but not significantly (see Florida table 1). Seedling B721-29 and Ona produced white tubers, and the latter compared favorably with Sebago in smoothness. LaRogue yielded deep red tubers at harvest. One red variety, Red LaSoda, and one red seedling, TL 8134, and three white varieties, Allehanna, LaChipper and Reliance, produced fewer US1A and US1B tubers than Sebago, but differences in yields were not significant. Allehanna yielded rough tubers, while the other white ones were smooth. The remaining 12 varieties and 7 seedling selections yielded significantly less than Sebago.

Florida table 1. Yields of 19 potato varieties and 9 seedling selections grown in replicated plots at Hastings, Florida in 1964. Planted 2/21/64^{1/}

Variety or Seedling	Yields in 100-pound sacks per acre (without pickouts) ^{2/}			Color of Tubers
	US1A	US1B	Total US1A US1B	
B721-29	170.6	22.6	193.3	White
LaRogue	184.3	7.1	191.3	Red
Ona	176.4	11.8	188.2	White
Sebago	171.7	12.7	184.4	White
LaSoda	176.0	5.1	181.1	Red
Allehanna	159.8	9.5	169.3	White (Rough)
LaChipper	153.8	11.4	165.2	White
TL 8134	146.9	13.6	160.5	Deep Red
Reliance	149.7	6.7	156.4	White
4682	147.5	6.3	153.8	White
Pungo	148.0	4.1	152.1	White
B69-16	144.7	5.6	150.3	White
B792-94	122.6	11.9	134.6	White
177-6P	124.1	5.6	129.7	Deep Red
Kennebec	124.5	4.5	129.0	White
Avon	116.9	7.3	124.1	White
B606-3	119.1	3.4	122.6	White
B2894-24	113.1	3.2	116.3	White
Satapa	111.4	4.9	116.3	Pink
Catoosa	103.4	11.6	115.0	Red
B2858-5	106.6	6.5	113.1	White
Teton	101.2	4.9	106.3	White
Emmet	99.9	6.9	106.8	White
Fundy	69.6	3.0	72.6	White
Superior	61.6	5.2	66.8	White
Keeweenaw	61.6	1.3	62.9	White
Snowflake	47.0	2.2	49.3	White
Pennchip	24.5	3.2	27.6	White
L.S.D. 19:1	28.0	4.5	28.4	
99:1	37.0	6.0	37.6	

^{1/} Based on yields from 13-foot, single row plots replicated 5 times; seedpieces planted 1 foot apart in rows 40 inches apart. Dug May 27, 1963--95 days after planting.

^{2/} Pickouts were rots and not extensive.

GEORGIA
J. E. Bailey

In 1964 cooperative yield trials with the United States Department of Agriculture were conducted in the mountain area of Georgia. The yields in hundredweight per acre are presented in Georgia table 1.

The crop was not graded this year because of the small tuber size caused by the severe drouth in May and June. Shoshoni B4557-2, B4523-8 and B4457-2 yielded very well considering the dry weather.

Georgia table 1. Potato variety test, Blairsville, Georgia, 1964.

<u>Variety</u>	<u>Total Yield</u> ^{1/}
	<u>Per Acre</u>
	Cwt.
Catoosa	130
Navajo	89
B3725-1	64
V. King	78
B3139-24	85
B4523-8	171
Shoshoni	159
B3309-8	79
B4828-4	135
B4269-16	106
B4557-2	229
B3353-9	117
B4473-3	164

^{1/} Potato varieties planted in field April 17, 1964.

IOWA

J. L. Weigle and L. E. Peterson

Muscatine Yield Trial (Iowa table 1). It was a good year for potatoes at Muscatine. The yield was above average and the exterior quality was good. The trial was planted April 9 and harvested August 11. The spacing was 14 inches in the row and 42 inches between rows. Ten tons of manure, 1000 pounds of 12-12-12 and 500 pounds of 0-0-60 were plowed under before planting. The plot was also side dressed with 200 pounds of 33-0-0. Note should be taken of the poor yields of varieties grown from seed saved from last year's Muscatine crop.

Acreage of Viking and possibly LaRouge will increase in the Muscatine area. They are apparently better adapted to this area than Red LaSoda for a medium maturity red variety. ND 4192-3 is likely to replace both Early Gem and Russet Burbank in the russet acreage. The greatest need at present is for an early white that will chip.

Muscatine Breeding Program. The major emphasis of the program is on developing early whites that chip. High temperatures at harvest in the Muscatine area apparently are detrimental to the chipping ability of those varieties now available.

Heat necrosis is also a problem and scab is becoming more apparent every year. The North Central Trial plot will be moved from Clear Lake to Muscatine this next season so that trial material will be tested under a much different set of conditions.

The red seedling, Ia 57410-10, which has performed quite well in several North Central states, will be released in the near future.

Iowa table 1. Potato variety trial, 1964.

Variety	Total Weight Per Acre	No. 1-A Per Acre	No. 1-B Per Acre	Specific Gravity
	Cwt.	Cwt.	Cwt.	
LaRouge	393	359	18	1.046
Viking	384	352	18	1.055
Norland	371	334	25	1.041
ND 4192-3	363	320	29	1.058
LaChipper	387	312	59	1.062
Kennebec	376	311	29	1.058
Fundy	316	281	20	1.066
Early Gem	329	273	14	1.042
Ia 57324-10	344	268	48	--
M-T-461-1	356	258	56	1.054
Wis. AG 56	330	247	47	1.065
Superior	268	237	16	1.060
Russet Burbank	321	215	37	1.063
ND 4192-3*	254	204	35	--
Arenac*	219	137	46	--
Emmet*	132	61	21	--
Average	322	262	52	1.0052
LSD 5%	49	53	13	.0004
LSD 1%	66	71	18	.0006

* Seed grown at Muscatine the previous year.

LOUISIANA

Julian C. Miller, James Fontenot and William A. Young

Approximately 25,000 seedlings were planted in October of 1963 and 2,042 were selected in January 1964 and were replanted at Rhinelander, Wisconsin on May 19, 1964. The growing season at Rhinelander was cut short as the temperature dropped to 21° F. on August 21. During harvest on September 23, 321 of these clones were selected. The greatest number of individuals were selected from the following family lines: (1) Cobbler x 11-64, (2) 11-170 x 1859, (3) Early Gem x 11-64, (4) Early Gem x Katahdin, (5) Cobbler x Katahdin, (6) 91-143 x 11-64, (7) 1859 x 12-8, and (8) LaChipper x Katahdin. After harvest the 321 selections were observed again and their specific gravity was determined. Fifty-two lines were discarded in the process.

To obtain the necessary diversity and derive the desired individuals, parents that possess the following characters were used: (1) wide adaptability, (2) high yield, (3) high culinary quality for specific purposes, (4) disease resistance such as scab and late blight, and (5) frost resistance.

Notes on 1963 clones. In the fall of 1963, 158 clones were finally selected (Louisiana Table 1). At this time the tuber supply of each line varied from 6 to 10 pounds. Three pounds of each line were shipped to Louisiana for further evaluation. After growing and observing these selections in Louisiana in the spring and in Wisconsin in the fall, only 21 were considered worthy of further study. L32-184 and L32-192 were the only two reds in this group. The following clones were rated better chippers than LaChipper: 31-55, 31-65, and 31-207 and the best lines showing little darkening after cooking were 31-11, 31-22, 31-37, and 32-192. As shown in Louisiana Table 1, most of these lines were high in specific gravity in the 1964 fall crop in Wisconsin.

Adaptation trials and performance summary of 1962 clones. The performance summary of 1962 clones is found in Louisiana table 2. The following lines yielded well: 21-30, 21-58, 22-111, 22-112, 22-173, and 21-203. Late blight and scab resistance was noted in lines 21-26, 21-37, and 22-47, and lines 21-116, 22-173, and 22-227 showed blight resistance and only slight resistance to scab. Lines 21-20, 21-85, 21-105, 21-203, and 21-239 were rated very high in scab resistance but were found susceptible to blight. Some lines were not consistent in their 1963 and 1964 chipping ability, but the lines that yielded good chip scores on both years were 21-31, 21-95, 21-116, and 21-199. This inconsistency was noted in after-cooking darkening and the clones showing the least darkening in these years were 21-10, 21-26, 21-30, 21-180, and 21-199.

After all factors were considered, the reds with the most promise at this stage are 22-111, 22-112, and 22-173. The whites with the greatest promise are 21-10, 21-20, 21-26, 21-30, 21-31, 21-37, 21-95, 21-116, 21-180, 21-199, and 21-203.

Frost resistance is another objective of extreme interest. Eight lines, five generations removed from S. acaule, show good horticultural characteristics, but their frost resistance is not what it should be. Restoring high frost resistance and maintaining good horticultural characters by intercrossing is being attempted. A number of these crosses were made this spring and seedlings from this seed are now being grown in the greenhouse.

Summary of 1961 lines. The performance of the 1961 selections is shown in table 3. L12-4 is the most promising red in this group and appears to be well adapted to the North and South. L12-8 and 12-142 are being maintained for breeding purposes because of their high resistance to scab. In this collection of reds we have two yellow flesh lines (12-166 and 12-167) that are used for breeding and maintained for use by other areas.

The most outstanding white lines are 11-40, 11-97, and 11-150. L11-40 is round and appears to be adapted to the North and South and is a better chipper than LaChipper. L11-97, another round white, has a high degree of both scab and field resistance to late blight. L11-150 is early and the smoothest oblong to be grown in Louisiana, is of high quality and has some blight and scab resistance. In this group two white clones (11-64 and 11-170) are outstanding as parents. The best chipping lines in this group are 11-40, 11-150, and 11-170. The lines showing the least darkening after cooking are 11-27, 11-64, 11-97, and 12-167. The plans at present are to enter 12-4, 11-40, and 11-97 in the regional trial next year.

Variety and outstanding clone comparisons. The yields and other data of standard varieties and promising clones are shown in Louisiana table 4. Red LaSoda and LaRouge are the outstanding red varieties in the final overall analysis. One of the most promising red lines is TL 7935.

As can be seen in this table, LaChipper is the best adapted white variety. This variety has always been the best variety in our chipping tests and is well received all over the country for chipping purposes. Unnamed white clones are: L11-40 for its chipping quality; and Neb. 4.56-9 for its good performance the last two years.

Fall variety tests, 1963. Results of a yield trial conducted at the Plaquemines Parish Experiment Station during the fall season of 1963 are reported in Louisiana table 5. Based solely on size, White Rose, 12-83, 62-162, and 12-4 produced the highest yields of U. S. No. 1 tubers. However, only 14 percent of the U. S. No. 1 size potatoes of the White Rose variety were not scabby. Seedlings 62-162 and 7627 showed the least incidence of scab, indicating that they were very resistant to scab, but both of these seedlings cracked badly. Entries showing susceptibility to scab were White Rose, 8148, 6894, Red LaSoda, and 11-57. Over 50 percent of the U. S. No. 1 size potatoes of these selections scabbed in this test. Seedling 11-57 yielded the most potatoes free of defects of the white selections. Seedlings 6937 and 7935 had the highest percentages of their tubers free of defects. However, the highest yields of U. S. No. 1 potatoes free of defects were obtained from the red seedlings 7935, 62-162, 12-83, and 12-4.

Variety tests, 1964. The growing season was considered much better in 1964 than in 1963, with the exception of cold, wet conditions at planting time.

Replicated yield trials were conducted at four south Louisiana and four north Louisiana locations. Three check or standard varieties, Red LaSoda, LaRouge, and LaChipper, were grown at each location in comparison with a number of advanced seedlings.

Saving four tubers of each first-year seedling selected in the greenhouse in Louisiana for planting in Wisconsin has aided in rapidly increasing seed supplies of seedlings considered promising. This, in turn makes it possible to place the promising seedlings in replicated and observational trials much sooner.

Results of these yield tests are given in Louisiana tables 6 and 7. A brief discussion of each test follows.

South Louisiana locations, New Roads, Louisiana. Twenty-seven varieties and seedlings were compared at this location. Good yields were obtained. Varieties and seedlings producing exceptionally high yields were LaRouge, 22-176, LaChipper, 11-57, and Red LaSoda. LaRouge and 22-176 yielded significantly higher than all other varieties and seedlings except those mentioned above. LaChipper produced the highest yield of all the white-skinned entries and seedlings 11-57 and 11-102 produced yields comparable to LaChipper. The yield of LaRouge was significantly higher than all other red-skinned seedlings except those produced by 22-176. Tubers of 22-176 had internal necrosis in this test.

Diamond, Louisiana, Plaquemines Parish Experiment Station. Red LaSoda, LaRouge, LaChipper, 12-4, 11-85, 11-96, and 11-150 produced good yields at this location. Yields varied considerably resulting in a high experimental error. Seedlings 22-176 and 12-83 did not perform well.

Thibodaux, Louisiana, Bayou Blue Area. Very good production was obtained at this location. Red LaSoda produced significantly higher yields than the other entries except LaRouge. LaChipper produced significantly higher yields than all the other white-skinned clones in the test. In an observational trial at this location seedlings 21-10, 21-26, 31-53, 31-57, and 31-113 were considered promising.

Hammond, Louisiana, Fruit and Truck Experiment Station. This test was planted late and yields were low. Seedling 12-83 produced the highest yield of U. S. No. 1's. LaChipper was the highest yielding white-skinned clone.

North Louisiana Locations, Chase, Louisiana. Red LaSoda and 22-241, a seedling from frost resistant parentage, produced the highest yields. LaChipper and LaRouge produced almost identical yields. Mounds, Louisiana, Red LaSoda, LaRouge, and 22-241 showed the best yielding ability. Potatoes of all varieties were small at this location and a high percentage of U. S. No. 2's and culls were obtained. Rayville, Louisiana, Red LaSoda produced the highest yield. Calhoun, Louisiana, yields were good at this location, but a large L.S.D. was obtained. LaRouge and Red LaSoda were the highest yielding red-skinned varieties. LaChipper and Katahdin were the highest yielding white-skinned selections. Russet Burbank had second growth and was very rough. Seedling 12-83 had second growth and 11-40 had large lenticels. LaRouge was considered smoother than Red LaSoda.

Summary

Replicated yield trials were conducted at eight locations in Louisiana. Three varieties, Red LaSoda, LaRouge, and LaChipper, were grown as standards at each of these locations. In general, production was higher at the south Louisiana locations than at the north Louisiana locations.

Red LaSoda and LaRouge produced almost identical yields and were among the top producers at each location. However, where scab is a problem, as was the case of the 1963 fall test at Plaquemines Parish Experiment Station, LaRouge produced a better yield. Red-skinned seedlings that produced good yields at various locations were 12-4, 12-83, 22-176, and 22-241.

Several white-skinned seedlings, 11-40, 11-85, and 11-150, have shown promise when compared to LaChipper. Seedlings 11-40 and 11-150 are considered as potential chippers when grown under Louisiana and Wisconsin environments.

Code number and parentage of breeding lines:

Code Number or Name		Code Number or Name		Parentage
Cherokee	B61-3	22-153	Cherokee x La. Mex.	1952
Early Gem	Russet Burbank x B96-56	52-42	22-194 (x)	1955
Katahdin	USDA 40568 x 24642	62-80	Cherokee x DeSoto	1956
LaChipper	Green Mountain x Cayuga	62-162	92-167 x 12-92	1956
LaRouge	02-5 (x)	72-122	226 x Gineke	1957
LaSoda	Triumph x Katahdin	91-28	81-113 (x)	1959
Norland	Red Coat x ND 626	92-77	52-42 (x)	1959
Pontiac	Triumph x Katahdin	92-95	6-148 x 1859	1959
Red LaSoda	Triumph x Katahdin (mutant)	02-1	72-6-3 x 1859	1960
Rushmore	Green Mountain x Katahdin	02-8	72-6-3 x 1859	1960
Sebago	Chippewa x Katahdin	12-8	52-42 (x)	1961
Triumph	Peerless x Early Rose	11-62	12-153 (x)	1961
1859	Pontiac x 96-56	11-64	B3692-4	1961
2988	B96-56 x Sebago	12-142	22-153 (x)	1961
6894	2910-1 x B3131-8	12-166	72-122 x 62-80	1961
6937	B792-88 x B962-32	11-170	Rushmore x B3692-4	1961
B3692-4	B2919-1 x Ac 25153	72-6-3	M.S.S. 4.2 x 22-153	1957
306.37		M.S.S. 4.2	(S.acaule var.Recoba 8n x Kat.) x CL. B. 72	
Ag 233	B962-32 x Minn.113.43-1-45			
91-143	Cherokee (x) 1949	M.S.S. 3.1	S.acaule var.Recoba (8n) x Katahdin	

Louisiana table 1. Performance of 1963 clones in Louisiana and Wisconsin.

Variety or Seedling	Parentage	Vigor 4/	Maturity 5/	Specific Gravity			Chip Rating 2/	After Cooking 3/ Darkening	Remarks
				Wisc. 1963	La. 1964	Wisc. 1964			
31-11	LaChipper x Katahdin	4.0	4.0	70	62	77	3.0	1.0	Bob, Mel; cooks very white
31-19	Cobbler x Katahdin	2.0	1.5	70	68	80	6.0	4.0	Hollow, baker
31-22	Cobbler x Katahdin	4.0	3.0	74	76	93	3.0	2.0	Bob, Mel, hollow, h. yield, baker
31-26	Cobbler x Katahdin	4.0	4.0	79					Stolon, pear, late, h. sprts, cracks
31-28	Cobbler x Katahdin	3.5	3.0	70	70	85	4.0	7.5	High yield, baker
31-31	Cobbler x Katahdin	4.0	4.5	60		89			Nice, seed, semi-stolon
31-37	Cobbler x Katahdin	3.0	2.0		73	88	4.0	2.0	Heat sprouts, baker
31-55	LaChipper x 11-64	3.5	4.0	65	71	83	2.5	3.0	Nice, hollow
31-65	LaChipper x 11-64	3.0	2.5	70	71	91	2.0	5.0	Good, early
31-66	Early Gem x 2988	2.5	2.5	75		90			Nice, seed
31-74	11-62 x Katahdin	3.0	3.5	74	64	88	4.5	3.0	Check
31-103	91-143 x 11-64	2.5	3.0	84	67	95			Mel super, high yield, green
31-105	91-143 x 11-64	3.5	3.0	81	64	85	4.0	4.5	Nice, seed
31-134	Early Gem x Katahdin	2.5	2.5		78	93	5.0	5.0	Low yield, internal necrosis
31-147	Early Gem x Katahdin	3.5	3.0		75	96	3.0	3.5	Low yield, heat sprouts, cracks
31-155	Early Gem x 11-64	3.5	3.0	69	59	86			Mel & Hastings, cracks, h. sprouts
31-172	Cobbler x 12-166	3.0	3.0	75	67	88	8.0	3.5	Heat sprouts, yellow
31-176	Cobbler x 11-64	2.5	2.5	74	59	85			Nice, seed
32-184	12-142 x 12-8	3.5	3.5	74	59	80			Super, internal browning
32-192	Red LaSoda x 12-8	4.0	3.0	70	59	80	6.0	2.5	Nice, high yield
31-207	LaChipper x 6937	3.0	2.5		72	90	2.5	5.5	Low yield, good, baker

1/ See footnotes 1 to 5, Louisiana table 2.

Louisiana table 2. Performance summary of 1962 clones.

Seedling	Parentage	1/ Specific Gravity			2/ Chip Rating		3/ After Cooking Darken.		Vigor 4/ Maturity 5/ Yield per acre	Blight 6/ Type 7/ Area 8/						
		La. Wis. La. Wis.			Rating		Cooking Darken.									
		63	63	64	64	63	64	63			64					
		63	63	64	64	63	64	63			64					
21-10	Cobbler x Katahdin	73	78	64	86	3.5	5.0	3.0	3.0	4	4	5	159	188	+ Russet	20
21-20	Early Gem x Kat.	70	74	68	70	4.5	6.5	-	2.5	4	4	5	163	174	+ 0	0
21-26	Early Gem x 91-28	79	83	76	87	3.0	5.5	3.0	2.5	4	4	3	124	137	- 0	0
21-30	Early Gem x 91-28	76	75	74	79	1.5	6.0	3.0	2.0	3	3	3	195	205	2	40
21-31	Early Gem x 91-28	74	72	72	88	2.0	3.5	4.0	3.0	4	4	5	174	189	+ 1	40
21-37	LaChipper x Kat.	70	70	87		4.5		3.0		3	2	2	169	183	- 0	0
22-47	92-95 (x)	62	64	59	80	3.5	7.0	2.0	6.0	4	4	4	87	94	- 0	0
21-58	Cobbler x Katahdin	77	80	75	90	2.0	7.0	4.0	5.0	3	3	3	193	211	+ 4	80
21-60	61-125 x Katahdin	75	70	69	90	3.0	4.0	3.5	4.5	4	4	4	164	177	+ 1	20
22-73	02-8 (x)				85											
22-78	02-8 (x)				75											
21-85	Wh. Rose x 91-28	67	68		80	3.5				4	4	4			+ 0	0
21-95	AG 233 (x)	84	81	81	95	3.0	3.0	4.0	2.5	3	2	2	148	179	+ 0	0
21-105	91-28 (x)	61	66	59	67	3.5	5.0		8.5	2	4	4	66	79	- 2	60
22-111	6894 x LaChipper	73	67	69	88	4.0	8.0	4.0	6.5	2	3	3	166	180	+ 4	10
22-112	62-162 x Kat.	72	71	59	83	7.5	7.0		3.0	4	4	4	235	268	- 2	40
21-116	6937 x 91-28	78	76	72	86	2.0	4.5		4.0	3	4	4	153	180	- 2	20
22-128	92-95 (x)	64	65		77	6.0				4	4	4	119	147	Russet	40
22-133	6894 x LaChipper	77	75		89	5.0		2.5		3	2	2	159	185	+ 3	80
22-173	Norland x 92-77	66	74	59	80	3.0	6.5		4.0	3	3	3	200	243	- 3	40
22-176	02-1 (x)				77					3	4	4	140	180	+ 1	10
21-180	Early Gem x 91-28	78	79	64	92	5.0	6.0	3.0	2.0	4	4	4	154	165	+ 2	40
21-199	AG 233 (x)	85	78	75	86	1.0	2.0	3.5	3.5	2	3	3	158	174	+ 3	80
21-203	AG 233 (x)		75	68	83		4.0		2.0	3	2	2	181	203	+ 0	0
21-222	M.S.S. 5.2 x Kat.				95											
22-223	02-1 (x)		74		86					3	4	4			+ 2	40
22-227	02-1 (x)		68		74					4	5	5			-	
22-230	02-1 (x)		65		71					3	2	2			+ 2	40
22-232	02-1 (x)		55		78					4	4	4			+ Russet	80
22-234	02-1 (x)				92										-	
21-239	02-8 (x)		73		90					4	5	5			+ 0	0

1/ 1.0 omitted from all specific gravity ratings.

2/ Rating according to color chart of Procter & Gamble Scale of 1-10;

the lower the rating the lighter the chip color.

3/ Rating 1-10 (1=most desirable; 10=least desirable).

4/ 1=weak; 2=fair; 3=medium; 4=vigorous; 5=very vigorous.

8/ Scab--Percent area covered.

5/ 1 = very early; 2=early; 3=medium;

4 = late; 5 = very late.

6/ Late blight: - = no blight; +=blight.

7/ Scab Pustule Type: 0=no scab; 1=small,

superficial; 3=large, rough pustule;

4=large, pitted.

Louisiana table 3. Performance summary of 1961 clones.

Variety or Seedling	Parentage	1/ Specific Gravity				Chip Rating 2/ After Cooking 3/ Darkening 3/	Yield Per Acre				Type 4/ Area 5/ Blight 6/ Vigor 7/ Maturity 8/					
		La.		Wis.			1963		1964							
		63	64	63	64		U.S.No.1	Total	U.S.No.1	Total						
12-4	1859 x Red LaSoda	59	67	59	76	5.0	5.0	172	194	175	207	2	10	+	4	3
11-7	1859 x Red LaSoda	64	70	59	78	7.0	3.5	172	185	147	164	1	20	-	3	4
12-8	52-42 (x)	58	63		65	4.0	7.0	138	161			0	0	+	3	3
11-27	LaChipper x Kat.	71	78	61	78	4.0	2.0			127	140	2	10	+	3	2
11-40	91-143 x Katahdin	63	73	63	92	2.5	4.0	167	191	164	180	1	10	+	3	2
11-64	B3692-4 (x)	62	74	69	77	3.5	2.0			141	150	1	40	-	4	4
11-66	B3692-4 (x)	68	75	68	84	6.0	4.5	141	163	150	167	1	20	-	3	5
11-80	306.37 x Kat.	67	74	67	81	4.5	6.0			185	201	2	40	+	3	4
12-83	1859 x Red LaSoda	58	64		73	5.0	7.5	244	275	185	216	3	10	+	4	3
11-85	1859 x Red LaSoda	60	65	59	73	8.0	3.5	203	223	181	197	2	20	+	3	4
11-97	LaChipper x Kat.	62	65	68		5.0	3.0	141	173	180	198	1	5	+	4	4
12-142	22-153 (x)	57	72		73	8.0	8.0					0	0	+	4	4
11-150	B3692-4 (x)	67	74	61	75	3.0	6.0	148	155	176	201	1	10	-	3	2
12-166	72-122 x 62-80	72	74	80	88	7.0	8.0			76	117	0	0	+	5	4
12-167	72-122 x 62-80	63	77	67	85	4.0	3.0			129	153	3	60	+	4	5
11-170	Rush. x B3692-4	66	87	71	84	3.0	5.0	171	192	142	165	0	0	-	3	5
Red LS	Triumph x Kat. (mutant)	59		59		6.0	3.5	215	250	235	254	4	40	+	4	4
LaRouge	02-5 (x)	63	65	59	72	5.5	3.5	222	242	244	262	2	30	+	4	3
LaChipper	Gr. Mt. x Cayuga	69	74	67	73	3.0	3.5	191	213	200	221	3	40	-	3	2

1/ 1.0 omitted from all specific gravity readings.

2/ Rating according to color chart of Procter & Gamble scale of 1-10; the lower the rating the lighter the chip color.

3/ Rating 1-10 (1=most desirable; 10=least desirable).

4/ Scab-Pustule Type: 0=no scab; 1=small, superficial; 2=large, still superficial; 3=large, rough pustule; 4=large, pitted.

5/Scab: Percent area covered.

6/Blight: - = no blight; + = blight.

7/1 = weak; 2 = fair; 3 = medium; 4 = vigorous; 5 = very vigorous.

8/1 = very early; 2=early; 3=medium; 4=late; 5=very late.

Louisiana table 4. Yield and quality comparisons of varieties and clones grown at Baton Rouge.

Variety or Seedling	4/ Vigor	5/ Maturity	Yield per acre		Sugar Content	2/ Chip Rating	1/ Specific Gravity	3/ After Cooking Darken.
			U.S.					
			No.1's	Total				
			Cwt.	Cwt.	Pct.			
Red LaSoda	4	3	235	254	.50	6.0	59	3.5
LaRouge	4	3	244	262	.50	5.5	59	3.5
Katahdin	3	4	172	181	.25	4.5	63	5.0
LaChipper	3	2	200	221	.10	3.0	67	3.5
Chippewa	3	4	199	214	.10	3.0	59	2.0
Russet Burbank	4	5	131	199	.25	7.0	71	3.0
Rushmore	2	2	155	162				
Early Gem	2	3	170	191	.25	7.0	59	6.5
12-4	4	3	175	207	.10	5.0	59	5.0
11-40	3	2	164	179	.10	2.5	63	4.0
12-83	4	3	185	216				
TL 7935	3	3	256	280	.50	7.0	59	7.5
TL 7627	2	3	180	197	1.25	5.0	69	4.0
B4523-8	3	2	179	201	.25	4.0	63	1.0
Wy 1122	2	3	165	177	.10	4.0	67	4.5
W 563	3	2	168	190	.25	6.0	74	6.5
I 57410	3	2	202	244	.50	4.0	63	6.0
Irish Cobbler	3	2	194	212	.10	3.5	70	3.0
Norland	2	2	173	189	.50	6.0	61	7.0
ND 4192-3	2.5	2	160	172	2.00	6.0	64	8.5
ND 4524-7R	3	4	204	227	.25	8.0	61	5.0
Red Pontiac	3	3	246	268	.50	7.0	59	4.5
Neb. 302.50-5	2	3	185	198	.10	3.0	63	2.5
Neb. 412.55-2	3	2	146	201	.50	5.0	59	4.0
Neb. 4.56-9	3	2	222	244	.25	3.5	60	5.0

1/ See footnotes 1 to 5, Louisiana table 2.

Louisiana table 5. Results of fall Irish potato variety test at Plaquemines Parish Experiment Station, 1963.

Variety or Seedling	<u>1/</u>		Free of		Cracks		Scab		<u>2/</u>		Remarks
	Yield	per acre	Defects	of	Pct.	Pct.	Pct.	Pct.	Yield	per acre	
	U.S.No.1	U.S.No.1	Pct.		Pct.	Pct.	Pct.	Pct.	U.S.No.1	U.S.No.1	
	Cwt.								Cwt.		
LaRouge	153		44		36		37		67		Round, smooth, dark red
	117		56		43		3		65		Oval, smooth, white
White Rose	199		14		9		86		28		Long, white, poor shape
11-57	184		45		9		51		83		Oblong, smooth, white
6937	95		77		9		19		73		Long, white
7935	179		70		4		24		125		Round, smooth, dark red
12-83	249		48		23		39		119		Round to flat, smooth, dark red
12-4	191		53		33		27		101		Round, smooth, dark red
62-162	216		56		41		2		121		Round to oblong, very dark red
Red LaSoda	133		28		28		68		37		Round to oval, red
6894	82		5		34		90		4		Round, smooth, very dark red
8148	69		8		58		92		4		Round, smooth, dark red
8117	137		40		33		49		55		Long, smooth, white
8112	66		47		21		29		31		Round, dark red, deep eyes
8134	113		38		16		43		43		Round to oblong, very smooth, dark red
LaChipper	68		53		14		45		36		Round, smooth, white

1/ Grade based on size only.2/ Adjusted yield eliminating tubers with scab and crack defects.

Louisiana Table 6. Yields per acre of Irish potato varieties and seedlings grown at different locations in south Louisiana, 1964 season.

Variety or Seedling	New Roads		Plaquemines Parish		Thibodaux		Hammond	
	U.S.No.1's	Total	U.S.No.1's	Total	U.S.No.1's	Total	U.S.No.1's	Total
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Red LaSoda	142	162	181	237	215	245	97	103
LaRouge	170	185	141	179	205	230		
LaChipper	160	177	131	150	175	189	98	105
12-4	105	126	132	171	146	177	100	106
11-28	60	68	45	61				
11-40	110	126	89	106	136	160	91	95
11-57	144	177	53	83				
11-66	125	148						
12-83	129	172	94	129	168	200	133	143
11-85	127	143	121 *	136				
11-96	113	147	124	169				
11-97	116	129	72	91	118	136	79	86
11-102	131	153	104 *	144				
11-128	47	55						
11-150	127	173	138	164				
12-157	126	147						
11-170	98	121	95	127	107	126		
22-176	169	200	66	98				
22-227	52	70						
22-232	105	122						
L.S.D.	.05	30	81		33			
	.01	40	109		45			

*L.S.D. does not apply.

Louisiana table 7. Yields per acre of Irish potato varieties and seedlings grown at different locations in north Louisiana, 1964 season.

Variety or Seedling	Chase, La.		Mounds, La.		Rayville, La.		Calhoun, La.	
	Sw. Pot. Res. Center		E. C. Woodyear		Henry Smith		N. La. Expt. Sta.	
	U.S.No.1's	Total	U.S.No.1's	Total	U.S.No.1's	Total	U.S.No.1's	Total
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Red LaSoda	93	113	79	117	69	92	126	178
LaRouge	85	109	63	128	33	50	131	183
LaChipper	88	107	46	120	41	67	104	158
Early Gem	67	86	47	137	42	66		
12-4			29	143	33	68	87	172
11-40	34	51					74	123
12-83			47	165			59	144
12-157	36	62	8	50				
22-241	93	120	65	162	36	68		
Russet Burbank							8	69
Katahdin							103	144
L.S.D. .05							49	
.01							69	

MAINE

Hugh J. Murphy, Allen E. Schark, Michael J. Goven

Cooperative variety trials were conducted in 1964 at Presque Isle and Fort Fairfield in Central Aroostook County, and at Corinna in Central Maine. Weather at planting time was ideal for rapid germination and emergence. June and July, however, were the lowest on record for moisture. Late August and early September were very favorable for the high yields recorded in 1964. The harvesting season was not excessively wet but cool weather prevailed most of the harvesting period.

All of the 1964 cooperative variety trials in Maine consisted of 33 entries, arranged in a randomized block design and replicated six times. Planting dates, harvesting dates, fertilization and seedpiece spacing for the various locations are presented in Maine table 6 of this report.

The parentage and characteristics of the thirty-three varieties tested in 1964 are presented in Maine table 1. Yields and specific gravities of all varieties at all locations are presented in Maine table 2.

Maine table 1. Parentage and characteristics of varieties and seedlings in cooperative yield trials, Maine, 1964.

Variety	Parentage	Maturity	Skin Color	Disease Resistance ^{1/}
Alaska 114	Cobbler x Minn. 13-1	M	W	
Allehanna	Unknown	L	W	
Cobbler	Unknown	E	W	Virus A.
Hunter	834(c)29 x F4823	L	Bu	Virus X, Vert. wilt.
Katahdin	40568 x 24642	L	C	Virus A, Lr., N.N.
Kennebec	B127 x 96-56	M	W	Lb., virus A., N.N.
Norgold Russet	A119-1 x ND242475	E	Ru	Sc.
Ona	B3021-3 x B2968-31	M	W	Lb., Sc., Vert. wilt.
Pennchip	3RD-5 x 3WH-9	L	W	Lb., Sc.
Russet Burbank	Unknown	VL	Ru	Sc.
Shoshoni	Early Gem x B2913-24	L	Ru	Sc., Vert. wilt.
Snowflake	Kennebec x ND457-1	E	W	Virus Y.
B3353-9	B355-24 x B911-31	M	W	Lb.
B3677-1	B779-1 x 3VW-9	L	W	Lb., Sc., Viruses X and A.
B3692-4	B2919-1 x Ac 25953	L	W	Lb., Sc., Virus Y.
B3726-6	Ac25959 x B3160-12	L	C	Lb., Sc., Lr.
B4123-10	B2925-23 x B2359-84	E	C	Lb., Sc., Lr., virus X.
B4273-18	B595-76 x ND457-1	E	W	Lr.
B4491-12	B3391-2 x B3944-11	ML	W	Lr.
B4808-3	B922-3 x B3391-2	M	P	Sc., Lr., Vert. wilt.
B4809-7	B922-3 x B3478-45	E	W	Lb., Sc., virus X
B4828-4	B3192-24 x Redskin	ME	P	Sc.
B4843-14	B4088-4 x B4154-2	M	W	Lr.
B4845-4	B4146-4 x Redskin	ML	C	
B4846-2	B4159-8 x Yampa	ML	Bu	Lb., Sc., virus X.
B4846-14	B4159-8 x Yampa	L	Bu	Sc., virus X.
B5011-17	B3556-12 x A180-26	ML	W	Virus X.

continued

Maine table 1, continued.

B5030-10	B4116-1 x B3478-45	L	W	R.R. virus X.
B5031-18	B4116-2 x B4154-2	E	W	Lr.
B5036-40	B4159-8 x Katahdin	M	W	Lb., Sc., virus X.
B5089-17	B606-3 x B3692-4	L	W	Virus X., Lb.
B5090-11	B607-56 x Merrimack	M	W	Lb., virus X.
B5132-3	B606-37 x B606-3	M	Ru	Sc., virus X.

1/ Late blight resistance is to the common race of the organism. Net necrosis is a tuber necrosis caused by current-season leafroll infection.

Maine table 2. Yield and specific gravity of potato varieties grown at 3 locations in Maine, 1964.

Variety	Presque Isle		Fort Fairfield		Corinna	
	Yield Per Acre	Specific gravity	Yield Per Acre	Specific gravity	Yield Per Acre	Specific gravity
	Cwt.		Cwt.		Cwt.	
Alaska 114	426	1.075	393	1.079	414	1.074
Alleghanna	479	1.067	405	1.073	446	1.068
Cobbler	425	1.080	337	1.076	383	1.078
Hunter	399	1.079	352	1.085	312	1.080
Katahdin	472	1.076	394	1.082	348	1.075
Kennebec	532	1.079	407	1.082	465	1.077
Norgold Russet	433	1.077	273	1.073	356	1.072
Ona	438	1.075	341	1.079	365	1.073
Pennchip	442	1.075		1.072	325	1.072
Russet Burbank	415	1.080	366	1.084	332	1.080
Shoshoni	430	1.071	434	1.078	424	1.072
Snowflake	441	1.072	361	1.071	397	1.072
B3353-9	382	1.065	329	1.070	387	1.067
B3677-1	511	1.064	444	1.070	312	1.065
B3692-4	487	1.072	409	1.075	427	1.071
B3726-6	398	1.084	336	1.088	281	1.085
B4123-10	506	1.070	354	1.064	467	1.066
B4273-18	442	1.077	297	1.069	328	1.071
B4491-12	395	1.077	383	1.087	373	1.079
B4808-3	393	1.066	373	1.067	364	1.066
B4809-7	452	1.069	326	1.069	376	1.069
B4828-4	441	1.060	346	1.061	405	1.062
B4843-14	456	1.086	412	1.086	464	1.083
B4845-4	467	1.075	429	1.082	365	1.077
B4846-2	371	1.079	354	1.086	295	1.081
B4846-14	433	1.087	374	1.092	409	1.086
B5011-17	506	1.077	479	1.083	360	1.077
B5030-10	431	1.080	347	1.082	377	1.079
B5031-18	415	1.083	342	1.088	362	1.082
B5036-40	483	1.076	385	1.082	445	1.075
B5089-17	481	1.074	444	1.079	386	1.074
B5090-11	445	1.074	391	1.077	469	1.073
B5132-3	458	1.070	349	1.071	451	1.071
LSD 0.05	45	0.003	55	0.002	46	0.003
0.01	59	0.004	74	0.003	60	0.004

Results of the first chipping and french fry tests are presented in Maine tables 4 and 5. Because of cool harvesting weather most varieties were unsatisfactory in fried color. Pennchip, and B5031-18 were the only two varieties in range of being useful for fried products without being blanched. Pennchip, however, was unsatisfactory in french fry texture.

Maine table 3. Percentage of yield between 1-7/8 and 4 inches in diameter for varieties grown at 3 locations in Maine, 1964.

Variety	Presque Isle		Fort Fairfield		Corinna	
	Class	Class	Class	Class	Class	Class
	1-7/8-4 inches	2-1/4-4 inches	1-7/8-4 inches	2-1/4-4 inches	1-7/8-4 inches	2-1/4-4 inches
Alaska 114	97	84	95	66	97	84
Allehanna	87	83	97	88	77	74
Cobbler	94	81	96	64	96	81
Hunter	96	87	98	85	91	86
Katahdin	94	87	96	85	91	86
Kennebec	84	80	98	89	83	80
Norgold Russet	62% 4 - 10 oz.		60% 4 - 10 oz.		55% 4 - 10 oz.	
Ona	98	88	97	71	97	86
Pennchip	97	86			94	87
Russet Burbank	63% 4 - 10 oz.		68% 4 - 10 oz.		52% 4 - 10 oz.	
Shoshoni	85	81	96	86	90	87
Snowflake	91	84	96	74	95	87
B3353-9	76	72	92	77	94	87
B3677-1	84	82	94	84	90	85
B3692-4	94	84	96	73	95	87
B3726-6	67% 4 - 10 oz.		75% 4 - 10 oz.		72% 4 - 10 oz.	
B4123-10	92	84	95	60	96	88
B4273-18	87	82	98	79	98	91
B4491-12	84	78	97	84	90	82
B4808-3	77	73	96	85	88	84
B4809-7	92	85	97	71	98	87
B4828-4	94	85	96	68	98	87
B4843-14	94	88	90	42	95	88
B4845-4	96	90	97	82	96	88
B4846-2	93	82	94	64	96	84
B4846-14	93	72	97	79	97	82
B5011-17	90	83	95	80	94	86
B5030-10	97	86	98	85	98	91
B5031-18	96	83	97	70	98	88
B5036-40	87	80	97	84	82	78
B5089-17	91	86	98	91	98	92
B5090-11	89	82	96	83	94	89
B5132-3	93	83	96	67	96	85

Maine table 4. French fry color and texture indices for potato varieties grown at Fort Fairfield, Maine, 1964 1/

Variety	Color Index	Texture Index	Variety	Color Index	Texture Index
Alaska 114	9.2	1.3	B4123-10	10.0	1.1
Allehanna	9.6	1.4	B4273-18	9.7	1.1
Cobbler	9.9	1.0	B4491-12	8.1	1.0
Hunter	9.4	1.0	B4808-3	9.9	1.7
Katahdin	8.4	1.0	B4809-7	10.0	1.2
Kennebec	9.0	1.0	B4828-4	10.0	1.2
Norgold Russet	10.0	1.1	B4843-14	8.7	1.1
Ona	9.5	1.1	B4845-4	8.7	1.0
Pennchip	6.6	2.6	B4846-2	8.8	1.1
Russet Burbank	8.3	1.1	B4846-14	8.8	1.0
Shoshoni	9.8	1.4	B5011-17	10.0	1.1
Snowflake	9.5	1.0	B5030-10	9.7	1.1
B3353-9	9.1	1.5	B5031-18	8.2	1.2
B3677-1	10.0	1.2	B5036-40	8.0	1.0
B3692-4	8.5	1.1	B5089-17	9.7	1.9
B3726-6	9.6	1.2	B5090-11	7.9	1.1
			B5132-3	8.7	1.3
LSD 0.05	0.6	0.3			
0.01	0.8	0.4			

1/ French fries with lower index numbers are lighter in color and lower texture indices indicate mealier texture.

Maine table 5. Chip color indices for potato varieties grown at three locations in Maine, 1964 1/

Variety	Presque Isle	Fort Fairfield	Corinna	Variety	Presque Isle	Fort Fairfield	Corinna
Alaska 114	9.5	9.8	9.0	B4123-10	10.0	10.0	10.0
Allehanna	9.7	10.0	10.0	B4273-18	8.9	10.0	9.1
Cobbler	9.0	10.0	9.1	B4491-12	8.4	9.5	8.5
Hunter	9.7	10.0	9.1	B4808-3	10.0	10.0	10.0
Katahdin	8.7	9.5	8.6	B4809-7	9.9	10.0	10.0
Kennebec	9.0	10.0	8.2	B4828-4	9.9	10.0	10.0
Norgold Russet	10.0	10.0	10.0	B4843-14	8.4	9.9	8.7
Ona	9.5	10.0	10.0	B4845-4	8.9	9.8	8.7
Pennchip	6.4	7.4	6.5	B4846-2	9.2	10.0	8.4
Russet Burbank	8.5	9.4	8.4	B4846-14	8.0	9.8	8.4
Shoshoni	10.0	10.0	10.0	B5011-17	10.0	10.0	10.0
Snowflake	8.7	10.0	9.5	B5030-10	9.9	10.0	9.7
B3353-9	9.4	10.0	7.9	B5031-18	7.6	9.5	7.6
B3677-1	10.0	10.0	10.0	B5036-40	7.6	9.6	8.2
B3692-4	8.9	9.7	9.2	B5089-17	10.0	10.0	9.7
B3726-6	9.6	10.0	9.0	B5090-11	9.0	9.9	9.2
				B5132-3	9.1	9.8	9.7
LSD 0.05	0.5	0.3	0.5				
0.01	0.6	0.4	0.7				

1/ Chips with lower index numbers are lighter in color.

Maine table 6. Pertinent information about Maine Potato Cooperative Variety trials, 1964.

	Presque Isle	Fort Fairfield	Corinna
Planted:	May 10	May 8	May 6
Killed:			
Early varieties	Sept. 8	Aug. 21	Aug. 21
Medium varieties	Sept. 8	Sept. 4	Sept. 8
Late varieties	Sept. 8	Sept. 19	Sept. 8
Harvested:			
Early varieties	Sept. 17	Sept. 2	Sept. 1
Medium varieties	Sept. 17	Sept. 15	Sept. 14
Late varieties	Sept. 17	Sept. 24	Sept. 28
Fertilization:			
(Pounds per acre)	120-180-180	130-130-130	112-168-168
Seedpiece spacing	<u>1</u> /	<u>2</u> /	<u>2</u> /

1/ Seedpieces of all varieties spaced 10 inches apart.

2/ Seedpieces of Norgold Russet spaced 12 inches apart, Russet Burbank spaced 16 inches, and Ona spaced 10 inches. Seedpieces of all other varieties spaced 8 inches apart.

MAINE

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Ring Rot Resistant Seedlings

The results of these annual tests, as previously indicated, are reported one year behind in order that tubers of selections appearing disease-free or questionable in the field can be checked after a storage period of five or six months. As in the 1962 tests only selections shown in previous plantings to have commercial promise were inoculated in 1963. New introductions totalling 186 yielded 18 which showed no evidence of infection and 21 which had a low incidence of infection (Maine table 7). Re-inoculation of 144 selections showing evidence of resistance in previous tests yielded 24 which showed no evidence of infection and 13 which had a low incidence of infection (Maine table 8).

Maine table 7. Advanced selections showing resistance in first-year, five-hill ring rot inoculation tests 1/. 1963

Pedigree	Parentage	Vine symptoms <u>2/</u>	Tuber symptoms <u>2/</u>
B 5233-9	Erie x Teton	0/5	5/20
B 5233-11	Erie x Teton	0/5	0/29
B 5233-12	Erie x Teton	0/5	0/30
B 5234-11	Erie x B 3627-18	0/5	0/30
B 5238-1	B 3696-13 x Merrimack	1 ?/5	0/24
B 5238-4	B 3696-13 x Merrimack	0/5	0/29
B 5238-6	B 3696-13 x Merrimack	0/5	0/40
B 5245-5	B 3692-4 x B 3696-13	0/5	0/24
B 5245-10	B 3692-4 x B 3696-13	0/5	4/23
B 5245-13	B 3692-4 x B 3696-13	0/5	0/29
B 5250-13	B 3556-12 x B 3692-4	0/5	3/40
B 5252-9	B 4095-7 x B 4168-3	0/5	0/24
B 5256-6	Erie x JQ-1	0/5	0/22
B 5256-15	Erie x JQ-1	1/5	0/21
B 5270-2	B 3201-38 x B 4312-4	0/5	0/20
B 5270-3	B 3201-38 x B 4312-4	0/5	4/20
B 5279-31	B 3879-3 x B 3627-18	0/5	0/24
B 5279-48	B 3879-3 x B 3627-18	0/5	1/30
B 5279-49	B 2879-3 x B 3627-18	1/3	0/16
B 5295-9	B 2834-3 x B 3139-24	0/4	1/15
B 5301-3	B 3692-4 x Merrimack	0/5	11/36
B 5301-10	B 3692-4 x Merrimack	0/5	1/33
B 5301-15	B 3692-4 x Merrimack	0/5	0/20
B 5304-7	B 4157-1 x B 4116-2	0/5	0/26
B 5304-16	B 4157-1 x B 4116-2	1/5	5/28
B 5304-42	B 4157-1 x B 4116-2	1/5	3/20
B 1620-1	Teton selfed	0/5	8/32
B 1626-1	B 3692-4 selfed	0/5	3/19
B 1628-15	B 3696-13 selfed	1/5	3/28
B 5251-3	B 4095-7 x B 2834-3	1/5	3/48

continued

Maine table 7, continued.

B 5253-12	B 4144-5 x B 4116-2	0/5	14/31
B 5253-18	B 4144-5 x B 4116-2	0/5	4/30
B 5253-27	B 4144-5 x B 4116-2	0/5	1/37
B 5253-35	B 4144-5 x B 4116-2	0/5	1/31
B 5253-47	B 4144-5 x B 4116-2	0/5	1/20
B 5251-7	B 4095-7 x B 2834-3	0/5	0/32
B 5251-13	B 4095-7 x B 2834-3	0/5	0/20
B 5251-15	B 4095-7 x B 2834-3	0/5	0/22
B 5304-17	B 4157-1 x B 4116-2	1 ?/5	0/28

Katahdin Checks (37 five-hill lots) 162/185

1/ A total of 186 selections were tested.

2/ Fractions indicate number infected/number examined.

Maine table 8. Advanced selections showing ring rot resistance in five-hill re-inoculation tests ^{1/}. 1963.

Pedigree	Parentage	Vine symptoms ^{2/}	Tuber symptoms ^{2/}
B 607-56	B 83-9 x 47102	0/5	1/23
B 725-61	X336-184 x Teton	1 ?/5	0/24
B 911-21	055 x Teton	0/5	0/30
B 3352-8	Saranac x Teton	0/5	0/29
B 3429-23	B 606-37 x Menominee	0/5	0/20
B 3454-5	B 2368-2 x B 2368-17	0/5	4/22
B 3478-45	B 721-30 x Teton	0/5	1/25
B 3696-13	B 3097-16 x Ac 25959	0/5	0/28
B 4829-7	B 3139-24 x B 3478-45	0/5	0/30
B 5000-18	B 3114-6 x B 3478-45	0/5	0/20
B 5019-7	B 3944-29 x B 3139-24	0/5	8/34
B 5030-10	B 4116-1 x B 3478-45	0/5	0/44
B 5052-7	Boone x B3692-4	0/5	1/21
B 4744-1	B 2969-15 x ND 457-1	1/5	10/19
B 4771-11	Yampa x B 3609-19	0/5	0/20
B 4835-7	B 3556-12 x B 3478-45	0/5	0/30
B 5006-8	B 3397-17 x B 3591-1	0/5	3/43
B 4987-14	47156 x B 3139-24	1/5	1/21
B 5000-1	B 3114-6 x B 3478-45	0/5	0/22
B 5000-9	B 3114-6 x B 3478-45	0/5	0/30
B 5000-14	B 3114-6 x B 3478-45	0/5	0/30
B 5000-19	B 3114-6 x B 3478-45	0/5	1/23
B 5000-21	B 3114-6 x B 3478-45	0/5	0/29
B 5012-22	B 3556-12 x B 3478-45	0/5	0/29
B 5031-22	B 4116-2 x B 4154-2	0/5	2/14
B 5092-7	X792-94 x Merrimack	0/5	1/40
B 4751-2	B 3428-41 x B 3139-24	0/5	0/40
B 4835-7	B 3556-12 x B 3478-45	0/5	0/40
B 4835-12	B 3556-12 x B 3478-45	0/5	0/30

continued

Maine table 8, continued.

Wy 1122	47096 Selfed	0/5	0/24
B 3352-8	Saranac x Teton	0/5	0/31
B 4552-8	WV 14-17 x B 3114-67	0/5	2/25
B 4289-7	B 902-2 x Merrimack	0/5	0/19
B 4289-11	B 902-2 x Merrimack	0/5	0/40
B 3478-22	B 721-30 x Teton	0/5	0/26
B 3478-23	B 721-30 x Teton	0/5	0/40
B 909-2	055 x B 30-143	0/5	0/32
Katahdin checks (27 five-hill lots)		114/135	--

1/ A total of 144 selections were tested.

2/ Fractions indicate number infected/number examined.

Maine table 9. Seedlings mechanically inoculated with the potato spindle tuber virus in 1962.

Pedigree Number	Parentage	Number Tested	Number read as Negative	Tomato Check 1963
B 1625	B 3950-1 Selfed	36	2	3/8, 3/8
B 1628	B 3696-13 Selfed	26	1	3/8
B 5240	B 3696-137 x B 4075-1	31	None	-
B 5250	B 3556-12 x B 3692-4	32	None	-
B 5253	B 4144-5 x B 4116-2	55	2	4/8, 7/8
B 5268	B 3139-24 x B 3692-4	45	None	-
B 5277	B 3627-18 x B 605-10	46	None	-
B 5279	B 3879-3 x B 3627-18	49	None	-
B 5293	NSI-6 x B 929-32	37	1	0/8
B 5299	B 3570-5 x B 4116-2	39	1	1 ?/8
B 5304	B 4157-1 x B 4116-2	42	1	8/8
Kennebec Checks		88	None	

Maine table 10. Seedlings mechanically inoculated with the potato spindle tuber virus in 1963.

Pedigree Number	Parentage	Number Tested	Number read as negative 1964
B 1652	B 606-3 Selfed	27	None
B 1653	B 2067-52 Selfed	50	None
B 5493	B 751-119 x B 4447-377	100	3
B 5495	B 3955-2 x B 4447-377	50	None
B 5500	B 4447-377 x B 96-56	26	None
B 5501	B 4499-6 x B 4482-26	100	1
B 5502	B 4499-6 x B 4447-377	99	None
B 5491	B 4523-8 x B 4482-26	35	None
B 5497	B 4094-21 x B 4447-377	59	1
Kennebec Checks		109	None

MAINE

F. E. Manzer, Donald Merriam, R. V. Akeley and A. Schark

Spindle Tuber Resistant Seedlings

A search for resistance to the potato spindle tuber virus (PSTV) was initiated in 1958. The methods used and the progress made in this program through the 1961 introductions are outlined in a paper in the American Potato Journal (in press) entitled, "Resistance in Solanum tuberosum to Mechanical Inoculation with the Potato Spindle Tuber Virus." ¹/ Annual summaries of progress in this program will be included in this report beginning with the 1962 and 1963 tests and will continue to be reported one year behind since current season infection readings cannot be made.

A total of 438 selections from nine crosses and two selfed lines were mechanically inoculated with PSTV, using the top-switching method, in 1962. Of these, nine were read as healthy or questionable in 1963, though tomato checks showed only one to be completely healthy and one questionable (Maine table 9). It should be noted here that further testing of any seedling beyond the first year is dependent upon available seed. Certain seedlings appearing resistant in first-year tests are discarded as a result of information gained from other concurrent tests.

The 1963 introductions included 546 seedlings from seven crosses and two selfed lines. Five of these seedlings remained symptomless when replanted for readings in 1964 (Maine table 10).

¹/ Table 4 in this article lists 11 seedlings which showed resistance in first-year and re-inoculation tests. Of these, only two, B4876-4 and B1609-5 have remained negative on further testing. Information was not available when the article was written.

MAINE

Geddes W. Simpson, Franklin E. Manzer, Donald Merriam,
Robert V. Akeley and Allen E. Schark

In 1964, some 324 selections from Chapman--some named varieties, but mostly seedlings were infested with viruliferous green peach aphids on June 23. When these selections were read on August 10 only two were found showing no symptoms of primary leafroll. In most cases all 5 hills showed symptoms of primary leafroll.

Maine table 11. Selections from Chapman in 1964 not showing current season symptoms of leafroll following inoculation with viruliferous green peach aphids in June, 1964.

Pedigree	Parentage	Not showing primary leafroll on August 10, 1964
B 4808	B 922-3 x B 3391-2	5/5
B 5006-15	B 3397-17 x B 3591-1	3/5
B 5031-4	B 4116-1 x B 4154-2	4/5
B 5031-18	" "	2/5
B 5031-24	" "	4/5
B 5286-20	B 4359-3 x B 4116-2	2/5
B 5286-24	" "	2/5
B 5304-20	B 4157-1 x B 4116-2	3/5
B 5093-1	X 792-94 x Merrimack	3/5
B 5415-1	X 1276-185 x B 4116-2	4/5
B 5415-5	" "	1/4
B 5415-11	" "	3/5
B 5440-3	B 3556-12 x B 4312-4	3/5
B 5453-4	B 3818-30 x B 4093-11	2/5
B 5523-10	B 3969-1 x Penobscot	5/5

Maine table 12. Selections from Chapman in 1963 saved for re-inoculation in June 1964 (309 selections in 1963).

Pedigree	Parentage	Not showing primary leafroll on August 22, 1963	Not showing primary leafroll in August 1964
B 3392-17	B 2187-25 x Katahdin	5/5	2/5
B 3570-5	B 2834-3 x (X 927-3)	5/5	4/5
B 4088-4	Houma x B 2834-3	5/5	1/5
B 4121-7	B 2925-23 x B 294-38	4/5	1/5
B 4127-2	B 2962-6 x B 2359-84	5/5	5/5
B 5007-9	B 3397-17 x B 4168-5	5/5	3/5
B 5015-2	B 3556-12 x B 4154-2	5/5	5/5
B 5015-6	" "	5/5	5/5
B 5015-12	" "	5/5	1/5

continued

Maine table 12, continued.

B 5015-20	B 3556 -12 x B 4154-2	5/5	5/5
B 5031-7	B 4116-2 x B 4154-2	5/5	4/5
B 5031-12	B 4116-2 x B 4154-2	5/5	2/5
B 5028-4	B 4095-1 x B 3556-12	5/5	5/5
B 5028-29	" "	5/5	1/5
B 5028-60	" "	5/5	5/5
B 5034-30	B 4154-2 x B 3391-2	5/5	3/5
B 5040-20	X 1276-185 x B 3556-12	5/5	5/5
B 5119-18	Houma x B 24-58	5/5	5/5
B 5119-27	" x "	5/5	5/5
B 5119-30	" x "	5/5	3/5
B 5248-3	B 1522-1 x B 606-3	5/5	5/5
B 5250-32	B 3556-12 x B 3592-4	5/5	3/5
B 5252-1	B 4095-7 x B 4168-3	5/5	1/5
B 5253-31	B 4144-5 x B 4116-2	5/5	5/5
B 5253-35	B 4144-5 x B 4116-2	4/5	2/5
B 5253-46	B 4144-5 x B 4116-2	4/5	5/5
B 5253-47	B 4144-5 x B 4116-2	4/5	2/5
B 5253-48	B 4144-5 x B 4116-2	5/5	2/5
B 5267-16	B 3095-11 x B 4116-2	5/5	3/5
B 5276-9	B 3397-17 x B 3570-5	5/5	4/5
B 5276-10	B 3397-17 x B 3570-5	5/5	3/5
B 5280-1	B 4095-1 x B 4116-2	5/5	2/5
B 5280-6	B 4095-1 x B 4116-2	5/5	5/5
B 5280-16	B 4095-1 x B 4116-2	4/5	5/5
B 5280-21	B 4095-1 x B 4116-2	5/5	5/5
B 5299-14	B 3570-5 x B 4116-2	5/5	2/5
B 5299-26	B 3570-5 x B 4116-2	5/5	3/5
B 5299-36	B 3570-5 x B 4116-2	5/5	4/5
B 5299-39	B 3570-5 x B 4116-2	5/5	3/5
B 5304-7	B 4157-1 x B 4116-2	5/5	1/5
B 5304-17	" "	5/5	5/5

MARYLAND (Eastern Shore)
W. W. Anderson and R. V. Akeley

Eight varieties and four seedlings were planted in four replicated plots on the farms of Arthur Langford (irrigated) and E. T. Mathews (non-irrigated), Pocomoke City, Maryland. The planting date was delayed about a month because of rains. After planting the growing season was unusually dry for the season with some rain occurring in August. Planting and harvesting dates, row and seed-spacing, and fertilizer rates and ratios for each farm are listed below:

	Date Planted	Date Harvested	Row Spacing	Seed Spacing	Fertilizer per acre
Langford Farm	May 5	Sept. 4	34 in.	12 in.	2200 (6-8-6) in furrow
Mathews Farm	May 5	Aug. 7	36 in.	12 in.	1600 (6-8-6) in furrow 500 (10-10-16) plowed down

In general the seedling varieties had rough tubers and hair sprouting except for B605-10. The varieties also had a tendency toward roughness and sprouting. Katahdin and Kennebec showed the best overall appearance.

The data in Maryland Table 1 shows the yield per acre on a total weight basis as well as the specific gravity of some of the selections. It is evident that irrigation resulted in more than doubling the yield per acre and had an influence on the specific gravity in the 1964 season.

Maryland table 1. Total yield and specific gravity of 12 potato selections grown on irrigated and non-irrigated fields at Pocomoke City, Maryland. 1964.

Potato Selection	Mathews Farm (non-irrigated)		Langford Farm (irrigated)	
	Total yield per acre	Specific gravity	Total yield per acre	Specific gravity
	Cwt.	Rating	Cwt.	Rating
Arenac	107	1.063	218	1.069
Katahdin	104	1.047	271	1.063
Kennebec	152	1.054	318	1.059
Merrimack	85	--	222	1.058
Ona	57	--	281	1.058
Pennchip	75	--	206	1.064
Penobscot	102	1.067	216	1.075
Pungo	70	1.059	219	1.066
B605-10	118	1.057	256	1.057
B4473-3	111	--	252	--
B4523-8	139	--	221	--
B4577-2	104	--	255	--
Means	102		245	
L. S. D. 05%	30		N. S.	

MASSACHUSETTS
Martin E. Weeks and David L. Field

The 1964 Potato Variety Trials

Twenty-eight varieties of potatoes were tested during the year on one or both of two fields in the Connecticut Valley. Twenty-one varieties were used on the University of Massachusetts Brooks farm which is on a Merrimac sandy loam and 26 were tested on a Hadley fine sandy loam on the University's new South Deerfield Farm.

At the later location due to dry weather conditions, most of the plots were very slow in coming up. Though this field gave quite good growth once they started the plots showed some differences throughout the season and L.S.D. values are high. This field received irrigation as needed. This factor caused a high incidence of hollowheart in some plots.

At Brooks' farm moisture conditions were somewhat better and the plots got a more even start. This field was limed at the 2-ton rate in 1962 from a pH of slightly above 5.0. This gave no noticeable effects on incidence of scab. The pH of the area is presently about 6.0.

The seed of the Keswick and Superior varieties seemed to be weak and growth and yields of these were not normal.

Fertilizers were used at the rate of 150-150-150-30 applied at planting time. Each variety was replicated four times in randomized blocks in 36-inch rows, 25 feet in length and with 8-inch spacings in the row. Guard rows of standard varieties were used on each side of the blocks.

Planting dates were April 27 and 28 and harvest on October 1. Vines were killed with Na_2HAsO_3 at one gallon per acre on September 15.

Plants were sprayed once a week with Thiodan from emergence until about the 20th of June when Malathion and Zineb were added. Sprays were conducted on a weekly basis throughout the season until the vines were killed.

During the growing season 10.41 inches of rain fell mostly in scattered showers. May and June were especially short receiving only 0.83 and 1.85 inches respectively. Due to this, emergence of some plants was delayed at South Deerfield and some of them did not catch up and give a uniform set of tubers. Except for this, growth was quite good with no undue trouble from diseases.

Chipping quality was judged by a standard procedure using the chart prepared by the National Potato Institute.

A planting of some 10 varieties was made in a field at Worthington where we normally test varieties at higher elevations and lower soil temperatures. This year, however, the field was harvested before yields could be taken. Growing conditions in that area were quite good.

Massachusetts table 1. Potato variety test, Brooks Farm, Amherst, Massachusetts, 1964. (Planted 4/28/64 and harvested 10/1/64).

Variety	Yield	Size B	Dry Matter	Color Rating
	Per Acre	Tubers	Average	of Chips
	Cwt.	Pct.	Pct.	
B3352-8	391.7	6.3	18.2	4.5
Green Mountain	323.4	3.4	19.6	
Pungo	305.6	1.2	18.1	5.5
B4843-14	292.2	4.4	20.4	4.0
Kennebec	283.5	1.9	17.2	3.5
Alaska 114	269.1	5.8	18.5	5.5
Katahdin	250.8	2.2	17.1	6.0
B4123-10	234.7	3.9	15.8	4.5
Russet Sebago	221.1	3.6	17.9	3.5
Russet Rural	221.1	3.5	18.9	4.5
Rushmore	207.2	2.8	16.3	4.0
B4828-4	204.4	6.8	16.4	5.0
B3692-4	202.6	5.4	18.5	4.5
Irish Cobbler	193.8	3.4	18.1	5.0
Penobscot	189.1	6.0	19.9	3.5
ND 4192-3	184.0	14.6	16.6	8.0
Norland	180.4	4.6	15.6	4.5
Fundy 428	160.4	4.8	17.9	4.0
B3478-48	144.1	3.8	17.4	4.0
Superior	91.5	7.2	17.3	3.5
Keswick	42.5	3.7	17.8	4.0
LSD .05	40.0			

Massachusetts table 2. Potato variety test, South Deerfield, Massachusetts, 1964, (Planted 4/27/64 and harvested 10/1/64).

Variety	Yield	Size B	Dry Matter	Color Rating
	Per Acre	Tubers	Average	of Chips
	Cwt.	Pct.	Pct.	
Russet Sebago	443.6	3.6	19.5	4.5
B3352-8	373.2	9.4	18.5	5.0
Katahdin	368.8	3.2	18.9	5.0
Green Mountain	367.0	4.2	20.3	
Penobscot	351.4	2.2	22.5	4.0
Emmet	350.3	5.6	20.5	7.5
B4828-4	339.8	5.3	17.8	7.0
B4123-10	335.0	7.0	17.8	6.0
Pennchip	328.9	3.4	16.9	4.5
LaChipper	327.8	4.6	19.4	5.0

continued

Massachusetts table 2, continued.

Kennebec	324.2	1.6	20.9	4.0
Fundy 428	295.5	2.6	18.8	4.5
Pungo	281.7	3.8	19.4	4.5
Arenac	272.6	9.4	20.0	4.5
Snowflake	263.6	4.2	18.4	4.0
Avon	248.4	4.8	20.1	5.0
Norland	248.3	5.2	15.6	3.5
Russet Rural	231.2	2.7	20.8	4.5
B3692-4	226.9	6.9	19.6	5.0
ND 4192-3	217.4	11.4	18.2	8.5
Alaska 114	205.5	8.8	19.2	6.0
Irish Cobbler	200.0	4.2	20.1	5.5
Rushmore	181.9	4.5	19.8	5.0
Superior	118.0	5.5	19.2	3.5
Keswick	65.4	4.0	19.0	4.5
No. 15*	255.0	4.7	18.3	5.0
LSD .05	108.2			

* Tubers received from Theis E. Aitken, Bethel, Vermont--Data from 3 reps.

MINNESOTA

Orrin C. Turnquist, Florian I. Lauer, Terry Sekioka, and Carl J. Eide

The objectives and scope of the Minnesota Potato Breeding Program continued along the same lines as indicated in prior reports. The report for 1964 will be concerned with the evaluation of new varieties and advanced selections.

Adaptation trials were conducted at Grand Forks, North Dakota, at the Red River Valley Potato Research Farm and on the peat soil at Hollandale, Minnesota. At these locations 36 advanced Minnesota selections were evaluated (Minnesota tables 1-9). Of these, 16 selections were saved for further testing. Four advanced selections (Minn. 53.54-7, Minn. 53.54-19, Minn. 69.57-96, and Minn. 26.57-11) will be placed in demonstration trials in 1965.

Potato variety demonstrations were conducted at eight locations in 1964. In the Red River Valley plots were planted at Grand Forks, North Dakota, Crookston, Newfolden, Baker, and McIntosh. Other plots were located at Big Lake, Hollandale, and Morris. With the exception of McIntosh where only ten varieties were tested, all the plots had twenty varieties planted in twenty-hill rows and replicated twice. At harvest the potatoes from the entire plot were weighed and graded for size. Samples were taken for specific gravity and chipping tests. The performance of the varieties is reported in Tables 1 through 9.

These trials are conducted in cooperation with commercial growers, county agricultural agents, branch experiment stations, and the Minnesota Department of Agriculture. Erratic growing conditions at most locations resulted in low yields. At Baker no yield data was recorded because of extremely poor stands of most varieties tested. A tuber increase plot of 136 lines of varieties and selections was grown under isolated conditions at Embarrass, Minnesota. A total of 203 lines of new selections and old varieties are being indexed in field plots at Homestead, Florida, during the winter of 1964-65.

A North Central regional potato plot consisting of 12 selections from different states was grown at Grand Rapids, Minnesota. This summary will be reported under the North Central Regional Trials, 1964.

The potato selection, T461-1, will be introduced in 1965 as the variety, Anoka. This is a white selection arising from a cross between Cherokee and B402-1. It is in the same maturity class with Irish Cobbler and shows some resistance to scab. Tubers are round to elliptical and thick. They are extremely uniform in size and shape with very shallow eyes. Tests have been very favorable relative to its processing characteristics. It does not appear to gray or discolor after cooking. Because of its smoothness and consistency in tuber type, it makes a very attractive market pack. About 5½ acres of healthy seed stock were certified by growers this past year.

Minnesota table 1. Summary of potato variety performance for 4 locations in the Red River Valley, 1964.

Variety	Total Yield Per Acre *	U.S.#1 Size*	Spec.** Gravity	Variety	Total Yield Per Acre *	U.S.#1 Size*	Spec.** Gravity
	Cwt.	Pct.			Cwt.	Pct.	
Viking	245	98	1.077	I 57410	178	88	1.077
Red Pontiac	218	95	72	Fundy	177	89	88
Bounty	214	91	80	ND 4524-7R	160	90	73
Excel	213	87	86	Norland	158	91	69
Katahdin	200	95	78	Irish Cobbler	156	86	87
Kennebec	186	93	77	Anoka	140	90	83
LaChipper	186	92	82	Ona	134	85	75
Norgold Russet	186	82	79	Penobscot	116	80	84
Shoshoni	186	95	74	Superior	113	87	84
Snowflake	184	90	80	Pennchip	111	79	72
				Average	173	89	79

* Average of Grand Forks, Crookston and Newfolden only.

** Average of Grand Forks, Crookston, Newfolden and Baker.

Minnesota table 2. Potato variety demonstration planting, Grand Forks, North Dakota, 1964

Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity	Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity
	Cwt.	Pct.			Cwt.	Pct.	
Bounty	250	94	1.092	Norgold Russet	175	89	1.079
Shoshoni	230	98	75	Norland	173	94	72
Snowflake	227	92	87	LaChipper	173	95	85
Viking	223	99	86	Pennchip	173	92	79
Kennebec	220	97	88	I 57410	172	90	83
Red Pontiac	216	97	78	Fundy	172	92	94
ND 4524-7R	216	92	76	Penobscot	172	95	94
Irish Cobbler	195	90	96	Katahdin	169	96	83
Excel	193	94	95	Ona	154	94	80
Anoka	192	96	92	Superior	113	92	94

Cooperator: Harry Earl

Planted: May 12 Harvested: September 9 Growing Season: 120 days

Minnesota table 3. Potato variety demonstration planting, Crookston, Minnesota, 1964

Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity	Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity
	Cwt.	Pct.			Cwt.	Pct.	
Viking	209	98	1.077	Ona	150	87	1.077
Irish Cobbler	202	91	88	Fundy	148	90	94
Bounty	197	93	82	Shoshoni	136	97	72
Excel	187	77	87	I 57410	129	90	78
Norgold Russet	170	86	79	LaChipper	124	91	83
Katahdin	167	94	76	Anoka	116	86	83
Kennebec	164	95	78	Pennchip	116	77	76
Red Pontiac	160	94	69	Penobscot	105	93	81
Snowflake	156	89	82	Norland	99	94	67
ND4524-7R	153	91	75	Superior	60	80	80

Cooperator: B. C. Beresford

Planted: May 27 Harvested: September 16 Growing Season: 113 days

Minnesota table 4. Potato variety demonstration planting, Newfolden, Minnesota, 1964

Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity	Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity
	Cwt.	Pct.			Cwt.	Pct.	
Viking	304	96	1.070	Shoshoni	191	91	78
Red Pontiac	278	93	74	Kennebec	173	88	70
Katahdin	263	94	76	Snowflake	169	89	76
LaChipper	261	89	81	Superior	166	88	83
Excel	258	89	82	Anoka	112	87	78
I 57410	234	84	76	ND 4524-7R	110	89	71
Fundy	212	86	84	Ona	98	71	68
Norgold Russet	202	71	82	Penobscot	71	53	78
Norland	202	86	78	Irish Cobbler	70	78	73
Bounty	194	86	71	Pennchip	45	69	63

Cooperator: Peter Tanberg

Planted: May 26 Harvested: September 16 Growing Season: 114 days

Fertilizer: 500 pounds 16-16-16

Vines killed by frost: September 11 Rotobeat: September 13

Minnesota table 5. Potato variety demonstration planting, Baker, Minnesota, 1964

Variety	Specific Gravity	General Rating	Variety	Specific Gravity	General Rating
ND 4524-7R	1.071	3	Snowflake	1.075	3
I 57410	72	3	Norland	66	4
Anoka	79	1.5	Superior	81	5
Excel	81	3	Bounty	76	2
Katahdin	78	4	Red Pontiac	69	3
Kennebec	73	4	LaChipper	80	4.5
Viking	74	3	Shoshoni	70	4.5
Norgold Russet	76	2.5	Irish Cobbler	80	5
Pennchip	72	3.5	Penobscot	83	5
Ona	76	3.5	Fundy	79	3.5

Cooperator: Gary Smith

Planted: May 20 Harvested: September 17 Growing Season: 121 days

Note: No yields were obtained due to very poor stand in both replications.

Minnesota table 6. Potato variety demonstration planting, McIntosh, 1964

Variety	Total Yield Per Acre	Specific Gravity	Variety	Total Yield Per Acre	Specific Gravity
	Cwt.				
Katahdin	204	1.084	Katahdin Mutant	141	1.083
Early Gem	186	74	B4093-18	129	72
Shoshoni	172	78	Russet Burbank	128	94
Anoka	169	78	Saskatchewan Rus.	118	89
Norgold Russet	145	76	Plymouth	98	87

Cooperator: Sidney and Duane Ostenaar of George Hegland Farm

Planted: May 29 Harvested: October 8 Growing Season: 133 days

Fertilizer: 300 pounds per acre 6-24-24

Minnesota table 7. Potato variety demonstration planting, Morris, Minnesota, 1964

Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity	Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity
	Cwt.	Pct.			Cwt.	Pct.	
Excel	152	56	1.086	Red LaSoda	118	76	1.069
Irish Cobbler	148	54	80	ND 4524-7R	118	73	67
Red Pontiac	145	75	64	Superior	118	68	82
LaChipper	139	61	76	Viking	116	66	71
Bounty	136	66	71	Early Gem	108	84	66
Cherokee	132	64	76	Kennebec	107	77	76
Norland	128	71	70	Anoka	99	57	78
Fundy	126	79	81	Russet Burbank	95	76	78
Norgold Russet	125	71	70	Snowflake	85	79	73
I 57410	121	72	23	Ona	51	47	70

Cooperator: Wes Gray

Planted: May 8 Harvested: August 31 Growing Season: 116 days

Minnesota table 8. Potato variety demonstration planting, Hollandale, 1964

Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity	Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity
	Cwt.	Pct.			Cwt.	Pct.	
Viking	375	98	1.067	Anoka	254	79	1.062
Bounty	354	92	56	Fundy	250	93	65
Red Pontiac	317	93	43	Kennebec	250	97	55
Excel	312	80	57	Snowflake	249	87	59
Irish Cobbler	303	85	60	Norland	234	88	56
Norgold Russet	295	93	57	Penobscot	218	92	61
LaChipper	286	77	60	Pennchip	217	90	58
Superior	285	93	67	ND 4524-7R	181	87	51
I 57410	261	86	57	Cherokee	180	90	64
Shoshoni	255	87	42	Ona	112	77	50

Cooperator: Henry Ravenhorst

Planted: May 14 Harvested: October 2 Growing Season: 142 days

Fertilizer: 650 pounds per acre 0-14-42

Minnesota table 9. Potato variety demonstration planting, Big Lake, Minnesota, 1964

Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity	Variety	Total Yield Per Acre	U.S.#1 Size	Spec. Gravity
	Cwt.	Pct.			Cwt.	Pct.	
Bounty	206	93	1.060	Keeweenaw	128	88	1.065
Red Pontiac	179	93	50	Anoka	112	84	63
Red LaSoda	169	86	61	Fundy	112	88	64
Irish Cobbler	155	64	64	Superior	111	84	58
Excel	155	84	74	Norland	104	80	50
Kennebec	148	86	65	Russet Burbank	95	64	64
Viking	145	92	60	Avon	94	71	60
ND 4524-7R	139	74	51	Early Gem	84	67	56
Norgold Russet	138	82	57	Snowflake	79	60	60
I 57410	136	83	55	Pennchip	74	70	68
Ona	134	67	70				

Cooperator: Les Zimmerman

Planted: May 6 Harvested: September 22 Growing Season: 139 days

Fertilizer: 900 lbs/acre 8-16-16

NEBRASKA

R. B. O'Keefe and David S. Nuland

This report is confined to the phases of the potato breeding program involving the screening of advanced selections and named varieties for disease reactions and adaptability.

Field Screening for Scab Resistance and Yielding Ability: One-hundred advanced selections and the check varieties Haig, Kennebec, Norland and Bounty were planted in 5-hill plots in scab nurseries at Scottsbluff and Alliance, Nebraska. The plots were planted during the first week of June and harvested during the first week of October. Plants were spaced 12 x 38 inches and grown under irrigation.

Thirty-nine clones were found to possess scab resistance equal to Haig and were superior in yielding ability. Bounty was used as the high-yielding, scab susceptible check variety. Nine clones were in the high-yielding, scab resistant group for 2 or more years. The results are presented in Nebraska table 1.

Greenhouse Screening for Reactions to Fusarium eumartii and Verticillium albo-atrum (microsclerotial). Forty-four clones (selected in recent years) were inoculated with Fusarium and Verticillium wilts using the tooth-pick method described in previous reports. The method was modified by growing the plants in ground beds in the greenhouse. Tubers were harvested to determine tuber susceptible and its relation to vine susceptibility. The variety Haig was used as the susceptible check variety. Eleven clones were found to be resistant to both organisms on the basis of vine infection. Significant correlations were found between tuber and vine susceptibility to Verticillium ($r=0.328^*$) and Fusarium ($r=0.418^{**}$). However, highly susceptible clones on the basis of vine infection were characterized by low percentages of tuber infection. Tuber infection is assumed to have been reduced due to the rapid deterioration and killing of tissue in the vines in advance of the organism. The results are given in Nebraska table 2.

Development of Varieties Suitable for Chipping and Processing. Two-hundred and sixty-two clones and varieties were evaluated for chip yield and quality following 5 months of storage at 38° F. and 3 weeks of reconstitution at 70° F. (Neb. table 3). A sample of 110 gms. of slices from 5 to 10 tubers of each selection were fried at 350° F. for 2 minutes. Oil was extracted from 10 gms. of pulverized chips in 75 ml. of toluene. Dry weights of the extracted samples were determined after 18 to 24 hours of oven drying at 70° C. Chip color (Rd) was determined with a Hunter Colorimeter using pulverized chip samples.

Thirty-seven clones were superior to Haig and eleven clones were superior to Kennebec in the ability to reconstitute following cold storage. Nine clones were in the superior group in 2 or more years of evaluation.

Potato Yield and Cultural Trials (David S. Nuland). The yield and grade quality of potato varieties released since 1956 and advanced selections were determined at 3 locations in the State. Fertilizer, plant spacing and herbicide studies were also conducted. The results are too voluminous to include in this report. They may be obtained by requesting the Horticultural Progress Report #42 from the Department of Horticulture and Forestry, University of Nebraska, Lincoln, Nebraska.

Nebraska table 1. Potato selections with scab resistance combined with high-yielding ability in 1964 tests (5 hills at 2 locations).

Selection	Tuber Color	Scab Data			Yield cwt/acre		
		Scotts-bluff ^{1/2/}	Alliance	$\bar{X}$	Scotts-bluff	Alliance	$\bar{X}$
*222.51-9	MR	2-1	2-1	2-1	255	129	212
* 16.55-1	Rus	3-2	2-1	2.5-1.5	411	184	198
*412.55-2	B.R.	2-1	3-2	2.5-1.5	183	132	168
* 10.56-2	MR	2-1	2-1	2-1	285	124	204
90.56-1	MR	0-0	2-1	1-0.5	431	237	334
* 94.56-2x	MR	2-1	2-3	2-2	139	264	202
* 96.56-1	DR	1-1	2-2	1.5-1.5	282	281	281
92.56-4	MR	1-1	2-2	1.5-1.5	299	129	269
* 99.56-3x	MR	1-1	3-2	2-1.5	521	151	336
99.56-4x	Rus.	2-1	2-2	2-1.5	282	72	177
99.56-5x	Rus.	3-3	2-2	2.5-2.5	285	118	202
1.57-1	Rus.	1-1	3-1	2-1	299	96	197
33.57-1	L.R.	1-1	3-2	2-1.5	312	116	214
37.57-3	D.R.	0-0	1-3	0.5-1.5	249	107	178
47.57-3	L.R.	1-1	2-2	1.5-1.5	345	182	263
50.57-3	B.R.	0-0	2-1	1-0.5	255	138	196
55.57-1	L.R.	0-0	5-1	2.5-0.5	257	193	225
66.57-2	L.R.	1-1	3-1	2-1	455	135	295
68.57-1	W	0-0	3-3	1.5-1.5	301	102	202
68.57-3	L.R.	1-1	2-2	1.5-1.5	307	149	228
71.57-2	L.R.	0-0	1-3	0.5-1.5	279	83	181
* 77.57-1	W	2-2	2-1	2-1.5	359	195	277
79B.57-2	W	2-1	3-2	2.5-1.5	299	168	233
79B.57-3	W	1-1	3-1	2-1	263	146	202
91.57-H18	Rus.	0-0	2-2	1-1	337	162	250
92B.57-2	W	1-1	2-1	1.5-1	428	72	250
112.57-2	D.R.	0-0	3-1	1.5-0.5	321	127	224
153B.57-4	M.R.	0-0	3-1	1.5-0.5	389	102	246
181.57-1	D.R.	0-0	4-1	2-0.5	307	83	195
199.57-2	B.R.	1-1	1-2	1-1.5	241	140	191
210B.57-4	W	0-0	1-2	0.5-1	337	173	285
* 22.58-1	L.R.	1-1	1-2	1-1.5	315	44	180
94.58-2	B.R.	5-1	0-0	2.5-0.5	307	132	219
48.59-1	L.R.	1-1	4-2	2.5-1.5	301	77	189
82.60-3	B.R.	2-1	3-2	2.5-1.5	337	132	235
71.60-1	M.R.	1-2	3-2	2-2	246	105	175
72.60-1	B.R.	1-1	2-2	1.5-1.5	318	80	199
A85.60-1	D.R.	1-1	3-1	2-1	307	127	217
61.62-2	M.R.	3-1	1-3	2-2	288	154	221
Haig		3-2	2-1	2.5-1.5	186	165	175
Kennebec		5-2	3-1	4-1.5	417	165	291
Norland		4-1	4-1	4-1	310	160	235
Bounty		5-2	5-1	5-1.5	293	173	233
LSD .05			Scab Type 1.3			Yield (Cwt)	110

*In scab resistant, high yielding group in 2 or more years.

1/ Scab type: 1-3=Surface scab; 4-5 = pit scab.

2/ Scab incidence: 1=1-20% of surface; 5=81-100% of surface.

Nebraska table 2. Reaction of Haig and potato selections to inoculation with fusarium and verticillium wilts under greenhouse conditions, 1964.

Variety or Selection	Verticillium		Fusarium	
	Infection Index <u>1/</u>	Tuber Infection <u>2/</u>	Infection Index <u>1/</u>	Tuber Infection <u>2/</u>
9.58-3	76	20	72	50
18.58-3	80	0	63	30
50.58-146	45	60	35	0
58.58-2	34	10	54	20
94.58-2	43	20	35	0
136.58-1	14	0	0	0
139.58-1	72	20	72	0
22.59-1	0	0	40	50
26.59-1	20	0	45	20
31.59-1	100	30	30	10
32.59-1	68	0	85	0
33.59-1	46	0	52	0
42.59-3	80	40	90	20
47.59-2	100	0	0	0
48.59-1	100	0	56	0
48.59-2	100	0	50	0
57.59-1	63	0	24	0
71.59-1	100	20	63	0
76.59-1	0	0	95	0
83.59-1	50	0	40	0
84.59-1	0	0	100	60
84.59-3	0	0	70	10
104.59-2	100	0	80	30
112.59-1	100	0	70	30
116.59-2	60	0	76	40
137.59-2	85	0	80	20
139.59-1	80	10	68	0
1.60-1	95	0	100	20
2.60-2	0	0	95	10
28.60-2	75	0	48	0
42.60-H4	85	0	58	40
47.60-2	75	30	0	0
52.60-1	17	0	0	0
54.60-1	45	20	0	0
58.60-1	50	50	85	0
61.60-2	50	0	90	40
62.60-2	95	20	70	0
64.60-6	72	0	90	70
70.60-2	85	60	0	0
71.60-1	54	10	48	30
79.60-3	85	20	48	20
82.60-3	0	0	90	0
84.60-9	36	0	36	0
85.60-1	58	0	58	0
Haig	85	10	78	0

1/ Based on 5 plants inoculated by the tooth-pick method: Index = No. of plants infected x 10 plus severity (1 to 5) of each plant x 2. Index of 0-45 = resistant; 45-70 = tolerant and 70-100 = susceptible.

2/ Percent of harvested tubers showing stem end discoloration.

Nebraska table 3. Chip yield and quality of superior selections following 5 months of storage at 38° F. and 3 weeks reconstitution at 70° F., 1964.

Selection	Chip Color ^{1/}	Percent Oil ^{2/}	Percent Dry Matter ^{2/}	Chip Yield ^{3/}	Parents	
					Female	Male
96.56-4	31.3	42.4	19.9	34.5	222.59-9	114.51-2
Katahdin	29.5	45.8	18.0	33.2		
10.56-2*	27.2	43.5	20.5	36.4	83.49-1	29.47-2
226.49-1x*	24.9	45.8	20.2	37.3		
71.59-1	24.7	39.0	22.2	36.4	133.53-1-1	Self
250.57-1	24.7	41.8		54.5	156.52-2	Wisc.137.52
55.57-1*	23.1	31.6	23.6	34.5	Wisc. 19	156.52-2
202.57-1*	23.0	36.6	20.5	32.3	90.49-1x	240.54-1
Platte *	22.7	42.2	16.8	29.1	Redbake	29.47-2
74B.57-4	22.6	41.2	21.4	36.4	I-78	223.48-1x
52.57-1	22.5	34.6	20.2	30.9	N.D. 27	156.52-2
79B.57-3	22.0	39.4	20.1	33.2	83.49-1	378.48-2x
18.58-1*	21.3	43.6	20.5	36.4	114.49-1x	104.52-2
77.60-2	20.9	44.2	19.8	35.4	89.56-1	40.57-3
83B.57-1	20.9	36.5	22.2	35.0	I-79	378.48-2x
42.60-4	20.8	44.9	17.5	31.8	38.53-23	Self
99.56-1	20.2	45.7	19.2	35.5	104.52-2	114.51-2
136.58-3	20.2	40.6	22.1	37.3	W21x-3	Wisc.137
64.60-4	20.1	45.8	17.7	32.7	1.57-1	93.55-3
72.60-1	19.8	45.3	18.9	34.5	40.57-3	89.56-1
74B.57-5	19.6	46.1	18.6	34.5	I-78	223.48-1x
74B.57-6	19.4	41.9	20.9	35.9	I-78	223.48-1x
139.58-1	19.0	48.7	16.3	31.8	104.52-2	191.50-1
213.57-1*	19.0	43.7		57.7	85.55-2	83.44-3
112.59-1*	18.9	43.3	19.6	34.5	91.57-H33	91.57-H31
52.60-1	18.9	46.2	19.6	36.4	38.53-23	98.53-1
58.58-2	18.7	44.5	19.7	35.4	222.51-9	140.53-1
244B.57-2	18.7	41.7		55.9	Wisc.137-52	N. D. 25
99.56-4x*	18.6	43.0	18.1	31.8	104.52	114.51-2
83.59-1	18.5	36.5	19.6	30.9	107.57-2	Self
9.58-3	18.4	43.0		52.7	114.49-1x	164.51-2
251B.57-4	18.4	52.0	26.2	54.5	156.48-2x	Wisc.137.52
56.57-2	18.2	38.9	19.4	31.8	156.52-2	164.51-2
8B.57-1	18.2	36.4	21.4	33.6	83.49-1	143.49-1
94.58-2	18.2	42.0	17.9	30.9	104.52-2	98.53-1
37.57-3	18.1	40.1	20.7	34.5	156.52-2	Self
28.60-1	18.1	41.4	18.6	31.8	112.52-2	104.52.2
s $\bar{x}$	+2.3	+3.6	+1.9	+2.4		
Checks:						
Haig	12.7	49.2	16.9	33.2		
Kennebec	20.2	44.1	18.3	32.7		
Bounty	14.9	40.3	20.9	35.0		

* In top group in 2 or more years.

^{1/} Rd based on white standard No.D 25-427 and taken with Hunter Color Difference Meter.

^{2/} Oil extracted from 10 gms. chips in 75 ml. toluene; converted percent dry matter in chips to 100 pounds at fresh potatoes.

^{3/} Pounds per 100 pounds of fresh potatoes.

NEW HAMPSHIRE
Paul T. Blood

In 1964, 15 potato selections were grown at Madbury, New Hampshire, in single-row plots 25 feet long and replicated four times. Seedpiece spacing was 10 inches for all varieties. Approximately 150 pounds of nitrogen and 250 pounds each of phosphorus and potash were applied per acre at planting. The whole plot was planted May 12 and harvested October 7. The yields, specific gravity and chip indices are shown in New Hampshire table 1.

New Hampshire table 1. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and chip color for 15 potato selections grown at Madbury, New Hampshire, 1964.

Selection	Yield Per Acre			Specific Gravity	Chip Color Indices 1/	
	Above	1-7/8 to	2 1/4 to		After 2/	After 3/
	1-1/2 inches	4 inches	4 inches		Harvest	Storage
	Cwt.	Pct.	Pct.			
Green Mountain	472	94	88	1.090	9.0	9.9
B2894-24	465	90	83	72	8.5	7.9
Shoshoni	464	92	87	72	9.0	10.0
Kennebec	424	93	84	79	3.0	8.3
WY 1122	416	94	87	70	8.0	8.4
B 4491-12	406	95	80	80	2.5	7.3
Penobscot	404	98	92	90	2.0	8.8
Katahdin	400	85	81	77	7.5	8.0
Mohawk	375	95	87	85	4.0	8.9
Menominee	358	92	86	79	4.0	9.2
46121	357	93	78	82	7.0	8.7
Reliance	356	86	76	67	8.0	9.6
Norland	316	98	87	64	3.5	7.3
Fundy	302	99	89	78	7.0	9.0
Avon	297	92	80	74	4.0	7.7
LSD 5%	53			03		0.9

1/ Chips with lower index numbers are lighter in color.

2/ Tubers stored at 40°F. and fried December 23, 1964, after 2 weeks' reconditioning.

3/ Test in the fall (storage temperature 55°F.)

NEW JERSEY
John C. Campbell

Potato variety trials were conducted at 3 locations in 1964.

Seabrook Farms: In the test conducted in cooperation with Seabrook Farms primary interest is in finding varieties that produce tubers of high solids and that will make superior frozen french fries. All varieties with a specific gravity of 1.070 or above are processed in the Quality Control Laboratory at Seabrook Farms and evaluated for color, consistency and flavor. These varieties are also evaluated for chipping, french frying, baking, boiling and mashing by the Food Science Department at Rutgers University.

Eighteen named and seedling varieties were replicated four times in randomized plots 40 hills long. Forty-eight seedling varieties were compared in single 40-hill plots and 40 additional seedlings were grown in 18-hill plots.

The varieties were harvested and graded as they matured and specific gravity was determined with a hydrometer.

Only Russet Burbank and Bounty produced yields of U. S. No. 1's that were significantly lower than Katahdin at the 5% level. Pennchip, F5459, Keswick, Hunter, Avon, F5247 and Irish Cobbler (New Jersey table 1) had a specific gravity above 1.070 and samples from these were processed.

Seedling varieties (New Jersey table 2) grown in single 40-hill plots and selected for repeats in 1965 were: B5012-14, B4845-2, B4756-3, F4631, 5719-4, B5012-8 and B355-35, B5088-23, B4795-3, B5011-12, B5006-8 and B5155-0. The last 6 listed had a specific gravity above 1.070. Seedlings grown in single 18-hill plots with high yields and specific gravity and selected for repeats were: B4878-21, B5238-1, B4829-3, B5003-4, B5031-4 and B4881-2.

Vegetable Research Farm: A similar experiment was conducted at the Vegetable Research Farm, New Brunswick, N. J. Twenty-one varieties were machine planted April 25 in 40-ft. plots replicated 5 times (New Jersey table 3).

Thirty-five additional varieties were planted in duplicated 40-ft. plots and 17 varieties were planted in single 40-ft. plots (New Jersey table 4). Twenty-five other seedling varieties were planted in single 15-hill plots making a total of 98 named or seedling varieties tested.

As in the other areas rainfall was very deficient and plots were irrigated 5 times with 1½ inches of water per application.

All varieties were harvested September 15 and 16. Only Chippewa and LaRouge produced yields significantly higher than Katahdin, however, both of these were considered too low in specific gravity (weighing in air and water) to be included in the processing evaluation test (New Jersey table 3). F5653, Superior, F4631, Russet Burbank, Snowflake and Bounty produced yields significantly lower than Katahdin. Superior was considered good enough in chipping and cooking quality to be continued and is recommended for early harvest. Eleven varieties in this group had a specific gravity above 1.070 and have been processed in our Food Science Department but these data are not yet available.

New Jersey table 1. Cooperative potato variety studies, Seabrook Farms, New Jersey, 1964. Yields and specific gravity are means of 4 replicates^{1/}

Variety	Yield per acre		Specific Gravity	U. S. No. 1		Remarks
	U. S. No. 1	Cwt. ^{2/}		B's	Pct.	
LaChipper	338 a		1.062	90	9	1% poor shape
Kennebec	325 ab		69	87	5	8% knobby
F5459	302 abc		87	85	11	4% off grade
Pennchip	292 abc		74	85	10	5% off grade
Keswick	289 abc		72	86	4	9% poor shape
LaRouge	282 abc		67	64	8	27% knobby
Katahdin	282 abc		65	93	7	None off grade
5765-1 (Picha)	266 bc		68	94	4	2% off grade
F5653	262 bc		57	73	4	22% poor shape
Hunter	262 c		76	81	14	6% knobby
Superior (Stark)	261 c		64	81	6	13% poor shape
Superior (S.D.)	261 c		67	83	5	12% knobby
Avon	259 c		71	79	12	10% poor shape
Snowflake	248 c		69	73	8	19% poor shape
F5247	247 c		77	79	13	8% knobby
Irish Cobbler	246 c		74	74	8	18% poor
Russet Burbank	185 d		74	59	17	24% knobby
Bounty	90 e		65	30	15	54% Fus. rot

1/ Seed hand planted 10" spacing in 34" rows--forty hills per plot (28 hills harvested). 1600 lbs. 10-20-10 placed in bands. Potash from sulfate of potash. Silt loam pH 5.8. Yields are average of 4 replicates.

2/ Yields followed by a common letter do not differ significantly from each other at the 5% level according to Duncan's Multiple Range Test.

New Jersey table 2. Acceptable seedlings grown in single plots in cooperative potato variety studies, Seabrook Farms, New Jersey, 1964.

Varieties	Yield per acre		U. S. No. 1	Specific	Remarks
	U. S. No. 1		B's	Gravity	
	Cwt.	Pct.	Pct.		
40-hill plots (28 hills harvested)					
F4631	313	90	6	1.064	4% O. G.
5719-4 (Picha)	304	92	4	69	4% O. G.
B4756-3	300	80	8	69	8% O. G.
B355-35	298	78	13	70	8% O. G.
B5088-23	283	84	12	71	2% O. G.
B4795-3	282	88	10	82	2% O. G.
B4808-8	282	94	2	66	2% O. G. Hi, S.G., at N.B., repeat
B4986-35	280	82	7	69	9% O.G.
B5019-17	280	82	9	64	8% O.G.
B5006-8	276	86	6	76	7%
B4987-14	265	84	4	58	11% good, N.B.
B5155-9	258	80	13	78	6% O.G.
Neb. 83.55-8	247	60	13	73	27% O.G., good, N.B.
Ona X Free	227	88	12	69	0% O.G., late maturity
B5052-18 <u>1/</u>	298	68	6	71	25% O.G., good, N.B.
Penobscot	214	70	17	88	13% O.G., Hi, S.G.
B5161-15	213	88	7	77	5% O.G.

continued

New Jersey table 2, continued.

B4814-2	197	73	16	1.080	10% O.G.
B4829-3	194	81	14	80	3% O.G.
B5031-24	192	83	14	67	3% O.G.
Green Mountain	179	80	9	75	11% knobby
<u>18-hill plots (14 hills harvested)</u>					
B4878-21 <u>1/</u>	309	78	5	72	16% gr. cr.
B5238-1	315	93	5	74	3% O.G.
B5003-4	292	77	8	71	15% knobs
B5011-12	291	89	10	74	
B4987-30	289	93	3	69	Large
B4850-28	277	80	4	66	6% O.G.
B4881-2	269	83	17	73	10% O.G., good appearance
B5023-44	254	70	9	70	21% O.G., good at N.B.
B4986-35	252	80	13	69	7% O.G., good at N.B.
B5031-24	234	86	7	64	7% G.C.
B5031-4	237	88	9	80	2% O.G.

1/ Average of 2 plots

2/ SG = Specific Gravity

O.G. = Off Grade

N.B. = New Brunswick

New Jersey table 3. Potato variety studies, Vegetable Research Farm, New Jersey Agricultural Experiment Station, New Brunswick, New Jersey, 1964. 1/

Variety	Yield per acre		U. S. No. 1 B's	Specific Gravity	Remarks
	U. S. No. 1	Pct.			
	Cwt.	Pct.	Pct.		
LaRouge	<u>2/</u> 218 ab	88	7.0	1.067	3.5% knobby
Chippewa	213 ab	91	7.0	64	No off grade
Kennebec	208 abc	88	7.0	75	4% knobby
F5459	189 bcd	84	10.0	87	3% knobby
Cobbler	189 bcd	93	6.0	71	No off grade
Green Mountain	184 cde	86	7.0	88	5% knobby
Hunter	184 cde	89	7.0	82	1.5% knobby
Katahdin	184 cde	93	5.0	72	1% gr. cracks
LaChipper	174 def	88	9.0	63	0.5% knobby
Avon	174 def	91	6.0	73	1.5% knobby
Keswick	169defg	92	5.0	72	2.0% skin spot
Pennchip	169defg	86	8.0	75	4% growth cracks
F5247	165efgh	85	9.0	78	3% knobby
F5653	155 fghi	90	7.0	60	1% growth cracks
Superior S	155 fghi	89	8.0	65	No off grade
F4631	150ghij	90	8.0	67	No off grade
Russet Burbank	145 hij	72	12.0	78	11% knobby
Superior SD	145 hij	89	8.0	62	No off grade
Superior Z	140 ijk	86	11.0	65	1% growth cracks
Snowflake	136 jk	83	11.0	69	1% knobby
Bounty	126 k	58	13.0	63	24% Fus. rot

1/ Fertilized with 2400 lbs.5-10-10 per acre seed spaced 10"x36" irrigated 4 times.

Mean yields and specific gravity of potato varieties and seedlings replicated 5 times.

2/ Varieties followed by a common letter do not differ significantly from each other at the 5% level according to Duncan's Multiple Range Test.

The following seedlings and varieties from the single or duplicate 40-foot plots produced acceptable yields and or specific gravity and will be tested again in 1965: Penobscot, B5023-44, B4809-11, B5019-17, Neb. 88.55-8, B4814-2, B4986-35, B5155-9, B5031-4, B4772-1, B5238-1, 5765-1 (Picha), B4795-3, B5006-8, B5161-15, B5052-18, B4808-8 and B4878-21. The following seedlings grown only in the 15-hill plots also produced good yields and high specific gravity: B5045-8, B4774-20 and B4839-9 (New Jersey table 4).

George Rue Farm: The third test was planted in 2-row duplicated plots using a 10-inch spacing in 34-inch rows. This experiment was fertilized with 2300 lbs. of a 5-10-10 at planting and were side dressed with 60 pounds of N when plants were 6 inches tall. The field was irrigated 5 times with 1½" of water per application.

Fifteen varieties were compared (2 sources of Superior). Top yields U. S. Ones were produced by Superior, Chippewa, Kennebec, Cobbler, F5459, and Hunter. LaRouge and Russet Burbank produced the highest total yields but both varieties produced many knobby or growth cracked tubers. Varieties with a desirable specific gravity were F5459, Green Mountain, Hunter, Kennebec, Russet Burbank, Pennchip, Cobbler and Katahdin (New Jersey table 5). Varieties having a specific gravity above 1.070 have been evaluated for chipping, french frying, baking, boiling and mashing. Specific gravity was determined by the weight in air weight in water method.

New Jersey table 4. Potato variety trials, Vegetable Research Farm, New Brunswick, New Jersey, 1964. (Includes selections with one or two replications of 40-foot plots).

Variety	Yield per acre	U. S. No. 1		Specific Gravity	Remarks
	U. S. No. 1	B's			
	Cwt.	Pct.	Pct.		
B5023-44	281	90	7	1.071	Large, sl. russet
B4987-14	227	93	4	65	Large, round, smooth
B4809-11	211	93	5	71	Long, russet
B5019-17	203	91	8	72	Good appearance
Neb 83.55-8	201	87	8	79	1% growth cracks
B355-35	194	89	6	70	1% growth cracks
B4814-2 (D)	194	90	7	72	Large, russet
B4986-35 (D)	194	88	8	71	2% knobby, few sprouted
B5088-23	194	89	7	65	2% growth cracks
B5155-9	194	86	10	86	2% poor shape
B5031-4 (D)	194	91	8	90	Long to oblong, sl. russet
B5238-1	189	89	7	77	Oblong, good appearance
5765-1	187	93	4	77	4% knobs, large, oblong
Penobscot	186	93	5	92	None off grade
B5161-15	186	89	8	78	Oblong, good appearance
B4795-3	184	88	7	90	2% knobby
B5052-18 (D)	184	89	8	73	Trace poor shape
B5006-8	184	93	5	77	Good appearance
B4878-21 (D)	174	85	7	76	Good in 15-hill plot
					5% growth cracks
B4808-8	174	95	5	80	Oblong, sl. russet
5719-4	172	89	5	72	2% growth cracks

continued

New Jersey table 4, continued.

B5031-24	167	88	10	1.069	Good in 15-hill plot Large, oblong, russet
Ona (regular)	167	83	13	67	Very late
Ona X Free	145	81	14	74	5% culls--late
B4878-21 (D)	390	90	6	72	2% off grade
B4881-2	336	94	4	65	Oblong, smooth, good appearance
B5052-18 (D)	317	88	4	77	6% knobby
B5045-8	317	92	6	76	Oblong-long, sl.russet
B5003-4	311	87	4	67	7% knobby, round, russet
B4986-35 (D)	308	91	6	73	Oblong to long
B5031-24 (D)	299	86	7	70	3% growth cracks
B4814-2 (D)	281	93	6	77	Large--russeted
B4987-30	263	95	4	70	Large
B4850-28	232	94	5	69	None off grade
B4809-11	227	88	6	63	Long, 4% rough
B5031-4 (D)	209	90	6	90	2% off grade

D--duplicate in 15-hill plot.

New Jersey table 5. Cooperative potato variety studies, George Rue Farm, New Jersey 1964.

Variety	Yield per acre	U. S. No. 1		Specific Gravity	Remarks
	U. S. No. 1	B's			
	Cwt.	Pct.	Pct.		
Superior <u>1/</u>	288	96	4	1.067	0% out of grade
Chippewa	274	86	10	65	2% scab and skin spot
Kennebec	270	82	11	70	5% second growth
Cobbler	261	83	12	71	2% second growth
F5459	260	81	13	95	3% second growth
Hunter	258	88.5	5	73	4% skin spot
Superior <u>2/</u>	255	90.5	6	68	3% poor shape
LaRouge	241	73	7	68	17% gr.cr., knobby, scab
LaChipper	233	80	14	59	3% scab
Katahdin	205	91	8	73	0% out of grade
Avon	202	83	11	66	2% poor shape
Pennchip	188	78	13	75	4% growth cracks
Green Mountain	186	69	11	93	19% second growth
Snowflake	178	73	10	66	12% skin spot
Russet Burbank	163	49	15	78	30% second growth
Keswick	160	70	6	69	22% skin spot

1/ Seed from South Dakota.

2/ Seed from Wisconsin.

NEW JERSEY

C. E. Cunningham^{1/}, R. V. Akeley^{2/}
T. E. Snyder^{1/} and A. E. Schark^{2/}

Cooperative Testing of Potato Varieties for Use in Soups

Varieties were grown in replicated yield tests at four locations in 1964. The locations and cooperators were as follows:

George Coombs, Shirley, New Jersey
Donald Bernath, Wauseon, Ohio
John Braun, Racine, Wisconsin
USDA, Presque Isle, Maine

Planting dates, harvest dates and cultural conditions were similar to those for other potatoes grown by each cooperator. At harvest, each plot from each of the yield tests was bagged separately and shipped to the Campbell Soup Company Laboratory, Riverton, New Jersey, by truck. The potatoes from each plot were graded, weighed and divided into 15-tuber sub-samples. Specific gravity determinations were made on one 15-tuber sample after arrival at Riverton. The remaining sub-samples were placed under various conditions of controlled temperature and humidity for later processing tests.

Methods of processing the potato samples for evaluation in frozen soups were the same as described in previous reports.

The results for the Maine, New Jersey, Ohio and Wisconsin locations are given in Campbell Soup tables 1, 2, 3 and 4, respectively.

Translucency is the phenomenon of potato dice appearing glassy or gray when immersed in milk. Lower translucency ratings indicate greater desirability for the products. Retained weights, expressed as percentages, are indicative of the tendency of potato dice to slough on exposure to uniform methods of treatment. Greater retained weights indicate lesser sloughing.

Campbell Soup table 1. Specific gravity, yields over 2 inches in diameter, retained weight of dice^{1/} and translucency rating of dice^{1/} of varieties grown at the USDA Field Station, Presque Isle, Maine, 1964.

Variety	Specific Gravity	Yield Per Acre Over 2"		Retained Weight ^{2/} Pct.	Translucency Rating ^{3/}
		Cwt.	Pct.		
B4829-7	1.063	442	97	42.0	5.8
B5000-18	77	525	96	58.5	6.8
B5006-6	70	368	90	47.4	7.5
B5006-15	76	446	96	55.9	7.0
B5031-18	86	445	96	43.6	7.5
B5052-7	68	432	97	76.4	7.3
B5066-3	72	508	97	47.2	6.8
B5088-7	62	463	97	48.4	7.3
B5090-11	69	436	69	54.8	7.3
La 6279	63	509	97	83.3	8.5
Poone	72	500	97	37.3	7.5
Cherokee	79	409	96	43.0	7.0

continued

Campbell Soup table 1, continued.

Chippewa	67	434	95	49.1	7.0
Katahdin	73	446	96	36.7	7.0
Kennebec	82	539	98	45.4	7.0
Keswick	80	416	98	60.4	7.3
Superior	76	472	98	46.3	7.3
Ona	76	441	96	34.6	7.3
Plymouth	75	450	98	38.7	8.0
Penobscot	90	435	97	50.3	7.5
Sebago	74	283	87	29.0	7.0
B725-61	71	506	97	59.4	6.5
B3429-23	72	374	96	64.8	8.0
B3478-45	84	477	97	37.1	7.5
B3819-17	78	432	91	50.2	7.5
B4088-4	73	362	98	60.5	7.0
B4160-1	73	407	93	59.3	7.3
B4590-6	66	441	95	51.3	7.8
B4605-13	64	403	98	47.3	9.0
Mean	1.073	441	95	50.3	7.3
LSD .05	.004	59		14.0	.9

1/ Results from after-harvest process.

2/ Lower percentages indicate greater sloughing.

3/ Higher ratings indicate greater translucency.

Campbell Soup table 2. Specific gravity, yields over 2 inches in diameter, retained weight of dice^{1/} and translucency rating of dice^{1/} of varieties grown at the George Coombs Farm, Shirley, New Jersey, 1964.

Variety	Specific Gravity	Yield Per Acre Over 2"		Retained Weight ^{2/} Pct.	Translucency Rating ^{3/}
		Cwt.	Pct.		
B4829-7	1.064	232	95	42.6	6.0
B5000-18	71	214	88	43.9	6.5
B5006-6	66	221	79	44.9	7.5
B5006-15	67	253	85	47.6	7.3
B5031-18	79	200	91	62.8	5.5
B5052-7	66	228	91	44.4	6.5
B5052-14	62	197	96	65.6	7.5
B5066-3	67	308	90	52.8	5.5
B5088-7	66	228	89	42.8	6.8
B5090-11	59	197	92	44.8	8.5
Boone	66	220	92	57.8	6.3
Cherokee	71			60.7	3.8
Chippewa	61	287	90	33.4	7.0
Katahdin	71	278	94	43.6	7.3
Kennebec	69	339	93	44.4	7.0
Keswick	76	292	97	48.6	6.5

continued

Campbell Soup table 2, continued.

Superior	67	319	97	46.6	7.0
Ona	71	230	86	41.1	6.5
Plymouth	72	225	93	44.8	8.7
Penobscot	80	237	90	52.2	6.3
Sebago	68	239	87	45.1	6.3
B725-61	66	218	80	67.0	6.3
B3478-45	71	242	90		
B4590-6	61	241	78	56.3	7.3
B4605-13	49	106	82	59.8	7.8
La 6279	52	275	94	65.3	7.5
Mean	1.067	241	90	50.4	6.8
LSD .05	.007	62		11.2	1.7

1/ Results from after-harvest process.

2/ Lower percentages indicate greater sloughing.

3/ Higher ratings indicate greater translucency.

Campbell Soup table 3. Specific gravity, yields over 2 inches in diameter, retained weight of dice^{1/} and translucency rating of dice^{1/} of varieties grown at the Donald Bernath Farm, Wauseon, Ohio, 1964.

Variety	Specific Gravity	Yield Per Acre Over 2"		Retained Weight ^{2/}	Translucency Rating ^{3/}
		Cwt.	Pct.	Pct.	
B4829-7	1.063	369	95	42.5	6.0
B5000-18	69	259	84	41.2	6.5
B5006-6	65	301	80	48.7	6.8
B5006-15	71	169	74	48.8	7.3
B5052-7	64	351	94	49.8	6.8
B5052-14	66	268	93	51.5	7.8
B5088-7	63	320	88	51.2	7.0
B5090-11	63	378	94	46.5	7.3
Boone	64	382	95	49.3	7.5
Cherokee	73	301	92	40.3	6.8
Chippewa	64	405	95	29.5	7.0
Katahdin	71	406	95	16.6	7.8
Kennebec	72	405	95	44.5	6.5
Keswick	79	291	88	47.9	6.5
Ona	68	308	90	23.6	6.8
Plymouth	70	296	94	27.5	7.8
Penobscot	75	233	90	33.3	8.3
Sebago	67	289	90	22.5	6.3
B725-61	62	281	88	49.7	5.3
B3478-45	72	307	87	30.5	6.8
B4590-6	60	370	87	50.7	7.3
Mean	1.068	319	90	40.3	6.9
LSD .05	.005	90		14.8	1.4

1/ Results from after-harvest process. 2/ Lower percentages indicate greater sloughing. 3/ Higher ratings indicate greater translucency.

Campbell Soup table 4. Specific gravity, yields over 2 inches in diameter, retained weight of dice^{1/} and translucency rating^{1/} of dice of varieties grown at the John Braun Farm, Racine, Wisconsin, 1964.

Variety	Specific Gravity	Yield Per Acre Over 2"		Retained Weight ^{2/}	Translucency Rating ^{3/}
		Cwt.	Pct.	Pct.	
B4829-7	1.062	240	96	53.5	6.0
B5000-18	63	117	83	58.8	6.5
B5031-18	79	120	80	62.1	7.0
B5052-7	72	196	95	56.9	6.8
B5066-3	65	201	91	42.7	6.8
B5088-7	67	-	-	51.4	7.0
B5090-11	67	-	-	46.7	7.0
Boone	69	259	97	50.8	7.3
Cherokee	70	144	91	58.1	6.0
Chippewa	64	154	87	42.7	7.3
Katahdin	77	268	96	29.6	6.3
Kennebec	79	238	94	52.3	7.0
Keswick	77	235	96	60.1	6.8
Superior	68	168	88	53.2	7.5
Ona	78	251	88	28.7	7.0
Plymouth	73	176	95	36.1	7.8
Penobscot	80	165	89	50.8	7.3
Sebago	75	-	-	38.3	7.0
B725-61	66	185	88	44.6	6.0
B3429-23	76	244	94	43.3	8.3
B3478-45	76	214	89	42.6	6.8
B4590-6	62	185	86	69.3	7.3
La 6279	60	199	96	81.1	7.5
Mean	1.071	198	91	50.2	7.0
LSD .05	.006	54		14.2	.8

^{1/} Results from after-harvest process.

^{2/} Lower percentages indicate greater sloughing.

^{3/} Higher ratings indicate greater translucency.

New York (Upstate)
E. E. Ewing, J. C. Bohn, and Ora Smith

Potato variety trials were established in 5 counties in Upstate New York. The Tompkins County trial was located at the Cornell University research farm near Freeville. Trials in Oneida, Erie, Steuben, and Orleans Counties were located on commercial potato farms and were conducted in cooperation with the respective Agricultural Extension Agents. The Orleans County plots were on a muck soil.

Foundation seed of F 4724 was supplied by Mr. H. J. Davies, Fredericton, New Brunswick. Seed of Pennchip was obtained from Dr. W. R. Mills, Penn State University. Mr. Ben Picha, Grand Forks, North Dakota, furnished the seed of Erlired, Reliance, Norgold Russet, and ND 4122-2; and Dr. A. J. Pratt provided seed of his Numbers 23 and 77. Professors L. C. Peterson and R. L. Plaisted supplied the Katahdin and Houma seed used in Broome County as well as seed of all "N.Y." lines tested. Irish Cobbler and Superior were obtained from commercial certified sources. Seed of all remaining varieties came from the U.S.D.A. Station at Presque Isle, Maine.

All five trials were arranged as randomized complete blocks with four replications, except that six replications were used in Broome County. Individual plots were 15 ft. long in Tompkins and Broome Counties, 12 ft. long elsewhere. All plots were two rows (70") wide. Seed was spaced at what was judged to be optimum distance for the variety based upon past experience or reports from other locations. The spacings used are listed in Upstate New York tables 1-5.

Weather during July and early August was generally dry in New York. Moreover a late spring frost set back potatoes at many locations on June 5, and early fall frosts hit the Tompkins and Broome County Trials in mid-September. The dry weather was most serious in Oneida and Broome Counties, where yields were quite low. Yields in the other 3 locations were moderate to good.

Total yields, yields of U. S. No. 1 tubers, maturity ratings, specific gravities, mean tuber size, tubers per foot of row, grading data, and comments on tuber appearance are presented in Upstate New York tables 1-5. Treatments which differ by more than the "D.₀₅" values listed in each table are significantly different at the 5 per cent level. The D.₀₅ is computed by Tukey's H.S.D. Test.

Growth cracking was especially serious this year at several locations, and some selections proved to be extremely susceptible to this defect. Scab was very severe in Oneida and Steuben Counties.

The outstanding variety in the Oneida trial was Viking, mainly because of its larger tuber size. It is possible that under better growing conditions Viking tubers would be larger than would be desired. Pratt's No. 23 produced very large numbers of tubers and should be given a wider spacing than other varieties in the trial. Except for their small size, the No. 23 tubers were very attractive and appeared to be resistant to scab.

Reliance gave top yields in Erie County. In Tompkins County it was a little below Katahdin in yield. The fact that significantly more tubers were set and that tuber size was less suggests that Reliance also requires somewhat wider spacing than Katahdin. Tuber appearance was only fair, although probably acceptable, and the percentage of misshapen potatoes was a little greater than is desirable.

Nevertheless, its early maturity and other desirable traits suggest that it is worthy of further trial in New York.

Other early maturing lines deserving further trial are ND 4122-2 (table 2) and No. 77 (table 4). The latter sets large numbers of tubers and should be spaced accordingly. Line B5063-3 is a late, red-skinned variety which produced highest total yields and the highest specific gravity in the Tompkins County trial. Unfortunately, a high percentage of its tubers had extremely deep indentations at the apical end. Among the newer varieties tested in previous years, Ona continues to look very promising for yield, tuber appearance, and percentage No. 1. Again, tuber set is high and average size is less than Katahdin. Sprouting and after-cooking darkening were similar to Katahdin, but chip color following storage has not been as good (table 6).

Norgold Russet is of interest because of its similarity to Russet Burbank in tuber appearance accompanied by relative freedom from misshapen tubers (table 2). Unfortunately, it appears to be inferior to Russet Burbank with respect to chip color, specific gravity, and after-cooking darkening. Also, it had significantly more sprouting than any variety except Erlired (table 6).

Upstate New York tables 6, 7 and 8, give the sprouting, after-cooking darkening, and chip color data for varieties in the 1963 trials. Determinations were made as described in the Thirty-fourth Annual Report, p. 125.

Upstate New York table 1. Early variety trial, Oneida County, 1964^{1/}

Variety	Yield per acre		U.S. No.1	Mean tuber wt.	Tubers per ft. of row	2/		Comments
	Total	U.S.No.1 1 7/8"-4"				per ft.	Specific Gravity	
	Cwt.	Cwt.	Pct.	Lbs.				
Viking	211	209	99	0.33	4.5	71		Medium red skin.
Superior	189	186	98	0.23	5.7	76		
Norland	189	182	96	0.19	6.7	57		
No.23 (Pratt)	163	153	94	0.15	7.7	67		Very attractive tuber, white skin.
I. Cobbler	166	100	60	0.23	5.1	78		Scab principal defect.
Erlired	134	72	54	0.16	5.8	61		" " "
D.05 (Tukey)	(69)	(104)			(2.6)	(09)		

^{1/} Planted April 29 (except Superior planted May 4); seed pieces 12" apart; 2000 lbs. 10-20-20/A. banded at planting; harvested Aug. 7. Extremely dry growing season. Mechanical injury not removed in grading.

^{2/} 1.0 omitted from all specific gravity readings.

Variety and Spacing	Yield per acre		U.S. 1 1/2		U.S. 2		Mean		Grade defects as % total yield				H.-Ht./ 30 tubers	Specific Gravity ^{3/}
	Total	Cwt.	No.	Pct.	No.	Pct.	No. 1 tuber wt.	Lbs.	Sun- burn	Mis- shapen	Over 1 lb.	Under 2"		
									Pct.	Pct.	Pct.	Pct.		
Reliance, 9"	366	277	76				0.34		7.4	4.2	0.9	9.5	0	68
Katahdin, 8"	313	247	79				0.34		5.4	1.2	0.5	10.5	0	65
Norgold Russet, 12"	316	243	77				0.32		2.3	1.5	0.0	13.1	0	67
ND 4122-2, 9"	303	241	80				0.29		3.1	0.5	0.0	15.4	0	71
Pennchip, 9"	280	219	78				0.30		1.7	1.8	1.2	12.7	4	69
R. Burbank, 16"	288	180	63				0.38		1.8	15.9	0.0	13.8	(not cut)	71
D.05 (Tukey)	(34)	(38)												(05)

1/ Planted April 28; 1700 lbs./A 12-12-12 (-3 MgO) banded at planting; vines killed Aug. 24; harvested Sept. 10.

2/ U. S. No. 1 tubers, minimum 2" diameter; maximum, 1 lb.; mechanical damage not removed.

3/ 1.0 omitted from all specific gravity readings.

Upstate New York, table 3. Muck variety trial, Steuben County, 1964. 1/

Variety and Spacing	Yield per acre		U.S. 1 1/2		U.S. 2		Mean		Grade defects as % total yield				Mechanical		Specific Gravity ^{3/}	of Skin
	Total	Cwt.	No.	Pct.	No.	Pct.	tuber wt.	Lbs.	Sun- burn	Mis- shapen	Over 1 lb.	Scab	Pct.	Pct.		
									Pct.	Pct.	Pct.	Pct.	Pct.	Pct.		
Norland, 12"	366	291	80				0.37		1.4	6.3	1.1	3.5	4.1	64	Medium	
N.Y. 16, 8"	412	280	68				0.42		2.8	12.4	4.6	6.0	2.8	66	Light	
B 4828-4, 8"	366	263	72				0.39		3.0	3.0	8.0	5.1	2.3	60	V. light	
Red Pontiac, 8"	339	188	55				0.40		2.2	14.4	2.2	11.5	5.7	65	Dark	
Red LaSoda, 8"	412	185	45				0.42		2.2	23.2	0.0	15.14	3.8	66	V. dark	
Erlired, 12"	293	126	43				0.31		1.7	7.0	0.0	27.9	12.0	66	V. dark	
D.05 (Tukey)	(72)	(98)														

1/ Planted May 5; muck soil; 1200 lbs/A 4-16-16; vines killed Aug. 3 and 10 (2 applications sodium arsenite); harvested Sept. 23.

2/ U.S. No. 1 tubers: minimum, 2" diameter; maximum, 1 lb.

3/ 1.0 omitted from all specific gravity readings, N.Y. 16 may be low due to hollow-heart, since 11 of 12 large tubers cut were hollow.

4/ Only enough Red LaSoda seed to plant 3 replications. Other varieties had most scab in 4th replication, so the reported value for Red LaSoda is probably too low.

Upstate New York, table 4a. Variety trial, Tompkins County, 1964.^{1/}

Upstate New York, table 5. Variety trial, Broome County, 1964

Variety and Spacing	Yield per acre		U.S. 2/ No. 1-2/	Mean tuber wt.	Tubers per ft. of row	Grade defects as % total yield			Specific Gravity ^{3/}	Tuber Skinning
	Total	U.S. 2/ No. 1-2/				Sun- burn	Mis- shapen	Mechan- ical		
	Cwt.	Cwt.	Pct.	Lbs.		Pct.	Pct.	Pct.		
Katahdin, 9"	245	216	88	0.35	4.6	2.6	0.0	3.2	82	Moderate
N. Y. 14, 9"	229	195	85	0.30	5.1	0.2	0.9	6.4	85	Slight
Houma, 12" 4/	213	182	85	0.30	4.8	0.6	2.3	3.8	85	Slight
Kennebec, 9"	237	176	74	0.36	4.4	3.5	4.1	8.3	85	V. bad
N. Y. 2, 12"	212	146	69	0.38	3.8	1.7	5.0	16.6	87	Serious
N. Y. 3, 12"	175	142	81	0.31	3.8	0.3	0.7	8.3	94	Slight
N. Y. 1, 12"	159	134	84	0.26	4.1	1.0	1.4	1.0	84	V. slight
N. Y. 13, 12"	211	---	--	0.35	4.0	(not graded)				
D.05 (Tukey)	(52)	(49)			(0.9)				(08)	

1/ Planted May 22; 3000 lbs/A 10-20-20; vines frozen Sept. 12; harvested Oct. 7.

2/ U. S. No. 1 tubers: minimum, 2" diameter; maximum, 1 lb.

3/ 1.0 omitted from all specific gravity readings.

4/ Houma showed considerable tubers with spindle tuber symptoms.

Comments on tuber appearance:

N. Y. 3 had best appearance, except rather small. Elongated tubers, v. smooth shape.

N. Y. 1 was round, skins white and very well matured.

N. Y. 14 was also attractive. Eyes medium. Tubers short for width.

N. Y. 2 was round with somewhat irregular shape. Russet skin.

Upstate New York, table 6. Variety trial, Tompkins County, 1963. Storage and cooking results.

Variety ^{1/}	Sprout Wt. as Pct. tuber wt. ^{2/}	Chip color, Agtron meter ^{3/}	After-cooking darkening rating ^{4/}
Ona	1.7	69	5.8
Sebago	1.8	74	6.8
Shoshoni	0.1	62	6.6
Katahdin	1.3	74	5.8
Pennchip	1.0	75	5.5
Kennebec	1.0	73	7.2
Wy 1122	1.0	71	6.5
R. Burbank	0.2	73	7.7
B605-10	1.0	64	7.1
Norgold R. (N.D. 4192-3)	3.3	64	6.3
B 3599-8	1.8	64	5.7
Erlired	3.5	69	7.7
D.05 (Tukey)	(1.4)	(11)	(1.0)

- 1/ Varieties ranked in order of U. S. No. 1 yields.
2/ Sprouts removed after 1 month in common storage and three months at 60° F.
3/ Agtron Reflectance Reading, where 70 indicates lower range of "acceptable" chip color. Fried after 1 month in common storage and 2 months in 60° F.
4/ Rated from 1-9, where 1 = severe after-cooking darkening; 9 = no darkening.
Means of 5 tubers from each of 4 field replications. Cooked Jan. 20, 1964.

Upstate New York, table 7. Variety trial, Orleans County, 1963. Storage and cooking results.

Variety ^{1/}	Sprout Wt. as Pct. tuber wt. ^{2/}	Chip color, Agtron meter ^{3/}	After-cooking darkening rating ^{4/}
N. Y. 2 (57G5-24)	1.3	73	7.0
N. Y. 14 (57G16-78)	2.2	80	7.4
N. Y. 13 (57G16-83)	2.5	78	7.5
Katahdin	1.8	78	7.0
N. Y. 3 (57G15-635)	0.8	72	7.6
Arenac	3.1	82	7.8
D.05 (Tukey)	(1.2)	(08)	(0.7)

- 1/ Varieties ranked in order of U. S. No. 1 yields.
2/ See footnote 2, table 6. 3/ See footnote 3, table 6. 4/ See footnote 4, table 6.

Upstate New York, table 8. Variety trial, Wyoming County, 1963. Chip color.

Variety ^{1/}	Fried ^{2/} Nov. 27	Chip Color, Agtron Reflectance Meter		Fried ^{3/} Nov. 27 ^{2/}	Fried Feb. 11
		Fried Feb. 11	Variety 1/		
N. Y. 1 (NUR-20)	69	83	N. Y. 15 (56N71-1)	72	86
N. Y. 7 (NGX-2B)	68	79	N. Y. 12 (57G10-6a)	84	85
Katahdin	58	86	N. Y. 17 (57G3-82)	75	84
N. Y. 5 (NII-2)	65	80	NRR-2	68	86
R. Rural	60	85	Empire	54	71
JLR-9	67	84	D.05 (Tukey)	(11)	(10)
NUT-15	65	90			

- 1/ Varieties ranked in order of U.S. No. 1 yield. 2/ Held 2 weeks after digging in common storage, followed by 6 weeks at 55° F. 3/ Stored 2 weeks in common storage, 6 weeks at 55° F., and 10 weeks at 60° F.

NEW YORK

L. C. Peterson and R. L. Plaisted

During the early spring months, 709 crosses were accomplished which involved parents selected for golden nematode, scab, and early-maturing-wilt resistance as well as yield, specific gravity, good chip color, and freedom from after-cooking-darkening. One set of crosses involved the use of pollen brought in from Peru from Solanum andigenum varieties.

Forty thousand seedlings were transplanted into 3-inch pots in the glass greenhouse and screenhouse. Close to 30,000 seedling hills were grown on Mt. Pleasant, near Ithaca. Of these, 2700 were selected initially on the basis of appearance, and this number will be reduced further on the basis of disease susceptibility and cooking trials conducted during the winter months. In addition, random bulk samples were saved for a progeny test of 24 advanced selections crossed to 12 testers. In another field on Mt. Pleasant, 1680 selections were grown in single ten-hill plots. On the basis of appearance, 350 were selected. Fifty or more of these will be discarded because of low specific gravity and unsatisfactory after-cooking-darkening or chipping test scores.

Two hundred entries were included in the first-stage-yield-trial which consists of 4 replications of 15-hill plots at Ithaca. It is of interest to report that of the 93 entries from the third cycle of recurrent selection for high specific gravity, 38 had a specific gravity equal to or greater than that of Green Mountain, 1.088, the best of the original parents. Ten were significantly better at the five percent probability level. On the average, the 93 clones from this program are lower in yield than the average of the remaining entries from other programs, indicating an adverse effect due to inbreeding depression. On the basis of yield, appearance and specific gravity, 90 of the total number of entries were saved. Twenty or more of these will be discarded before spring on the basis of chip color, after-cooking-darkening, and scab susceptibility.

The second-stage-yield-trial of 4 replications of 15-hill plots at Ithaca and Riverhead included 71 entries. Nineteen of these were saved for winter quality tests. The third-stage-yield-trial consists of 6 replications of 15-hill plots at Ithaca and Riverhead and 4 replications of 15-hill plots at Wainscott. Of the 25 entries in this stage, 7 were saved for further evaluation. Seed of these will be introduced to the State Foundation Seed Farm.

Twenty of the advanced clones were grown in regional yield trials at Ithaca, Riverhead, Wainscott, and Wyoming, Allegany, Steuben, Orleans, Oneida, Broome, and Monroe Counties. Several of the county trials were grown in cooperation with Dr. E. E. Ewing of the Vegetable Crops Department and the county agents. The Riverhead trials were grown at the Long Island Vegetable Research Farm. The results of these trials are given in the following New York tables 1 to 11. The following tentative decisions have been made with regard to these clones.

NY-1 did not yield as well as in years past, but maintained a good tuber shape and size distribution so that these, coupled with its resistance to the golden nematode and good quality for table-stock and chipping deserve its continuance.

NY-2 appears to yield satisfactorily and have reasonably good shape. It is variably russetted depending on location where grown. Its principle attributes are its high specific gravity and long tuber dormancy. It will not chip well and has no disease resistance.

For the last two years NY-3 has not yielded as well as Katahdin, but has out-yielded Russet Burbank. It has a very attractive elongated, blocky tuber which is slightly russetted with shallow eyes. The most striking aspect of this potato is its extreme mealiness when baked, even beyond that expected for its generally high specific gravity. It has the R_1 gene for blight resistance.

NY-4 will be discontinued in spite of its high yield because of too many growth cracks. NY-5 will be discontinued because of low yields and shape defects.

NY-6 is consistently the highest yielding clone in our trials. It has a fairly good shape, and a fairly heavy set of tubers. It has resistance to the golden nematode and will be continued.

NY-7, NY-9, and NY-10 will be discontinued primarily due to unsatisfactory yields.

NY-11 will be continued another year in spite of its poor yields this year because of its scab resistance and because in years past it has yielded better than Katahdin. It will not chip but does have good after-cooking-darkening scores and is R_2R_4 for blight resistance.

NY-12, NY-17, and NY-18 are excellent chipping potatoes but will be dropped due to low yields. NY-13 has unsatisfactory yields, tends to be coarse in appearance, and will be dropped also.

NY-14 appears to have promise with regard to yield, appearance, specific gravity, and chipping ability. It has no disease resistance and its best single attribute is its whiteness after cooking.

NY-15 has very attractive tubers. Its yield is slightly lower than that of Katahdin while its gravity is no better than Katahdin. We are tentatively saving this one because of its good chipping ability.

NY-16 is a high-yielding, light-red clone with a relatively low specific gravity and satisfactory freedom from after-cooking-darkening. Its principle attributes, in addition to yielding ability, are its chipping ability and resistance to early-maturing-wilt. If it continues to make light colored chips after reconditioning, it may have a place in this market.

NY-19 and NY-20 are problems because they have generally yielded just slightly better than Katahdin, had somewhat higher specific gravity, and have been somewhat better in after-cooking-darkening scores. Their appearance is satisfactory, but not outstanding. NY-19 will not chip and NY-20 has given variable results. They have no disease resistance. Final decision will come after this winter's chipping and cooking tests, but chances are they will be discarded because they do not really offer much in contrast to Katahdin.

B4494-6 is a golden nematode resistant clone which has been preserved independently by both Cornell and the USDA program in Maine. Its yields have been generally satisfactory, but its appearance has been quite variable.

New York table 1. Potato variety trial, Ithaca, New York, 1964.
(6 replications, 30-hill plots, and 12" spacing).

Pedigree	Yield Per Acre			No. of Tubers Over 2½"/150'	Wt./Tuber Over 2½"	Specific Gravity ^{1/}
	Total	Over 2½"	Over 2½"			
	Cwt.	Cwt.	Pct.			
NY-3	433	403	93	748	.67	92
4	560	528	94	833	.79	76
5	486	454	93	873	.65	84
6	544	509	94	997	.64	73
7	445	416	93	596	.87	77
9	410	371	90	739	.63	82
10	490	441	90	835	.66	82
11	514	455	89	907	.63	86
12	498	441	88	1142	.48	94
13	459	436	95	718	.75	83
15	440	422	96	626	.84	73
16	516	497	96	641	.97	68
17	387	349	90	786	.55	85
18	458	410	89	809	.63	94
19	532	491	92	737	.83	84
20	541	514	95	893	.72	83
B4494-6	454	418	92	658	.79	79
Avg 2 Kat	512	489	94	749	.82	75
LSD .05		44		150		05

^{1/} 1.0 omitted from all specific gravity ratings.

New York table 2. Potato variety trial, Ithaca, New York, 1964.
(6 replications, 15-foot plots, and 9 and 12" spacing).

Pedigree	Yield Per Acre			No. of Tubers Over 2½"/90'	Wt./Tuber Over 2½"	Specific Gravity ^{1/}
	Total	Over 2½"	Over 2½"			
	Cwt.	Cwt.	Pct.			
Katahdin 9"	536	497	93	468	.66	75
12"	519	481	93	412	.72	
NY-1 9"	521	447	86	519	.53	79
12"	513	460	90	508	.56	
NY-2 9"	506	470	93	495	.59	88
12"	541	504	93	494	.63	
NY-14 9"	583	540	93	544	.62	76
12"	575	529	92	486	.68	
LSD .05		46				

^{1/} 1.0 omitted from all specific gravity ratings.

New York table 3. Potato variety trial, Riverhead, Long Island, New York, 1964.
(6 replications, 30-hill plots, and 10" spacing).

Pedigree	Yield Per Acre			No. of Tubers Over 2½"/150'	Wt/Tuber Over 2½"	Specific Gravity ^{1/}
	Total Cwt.	Over 2½" Cwt.	Over 2½" Pct.			
NY-3	359	248	69	538	.47	76
4	494	374	76	698	.55	64
5	430	320	74	634	.52	72
6	520	423	82	727	.60	68
7	372	316	86	481	.67	75
9	359	268	74	559	.49	70
10	405	284	70	517	.56	68
11	461	353	76	676	.53	75
12	449	296	64	626	.49	77
13	414	306	74	589	.53	79
15	389	318	82	638	.51	62
17	311	225	72	518	.45	69
18	456	374	82	742	.52	78
19	498	408	82	770	.55	71
20	469	388	84	752	.53	73
B4494-6	401	343	86	551	.64	68
Avg 4 Kats	449	369	82	636	.60	65
LSD .05		46		103		06

^{1/} 1.0 omitted from all specific gravity ratings.

New York table 4. Potato variety trial, Riverhead, Long Island, New York, 1964.
(6 replications, 15-foot plots, and 9" and 12" spacing).

Pedigree		Yield Per Acre			No. of Tubers Over 2½"/90'	Wt/Tuber Over 2½"	Specific Gravity ^{1/}
		Total Cwt.	Over 2½" Cwt.	Over 2½" Pct.			
Katahdin	9"	430	348	81	478	.45	63
	12"	387	305	79	425	.45	
NY-1	9"	434	288	66	521	.34	72
	12"	417	300	72	501	.37	
NY-2	9"	369	260	71	439	.37	77
	12"	374	274	73	426	.40	
NY-14	9"	427	307	72	500	.38	71
	12"	386	282	73	438	.40	
LSD .05			30				

^{1/} 1.0 omitted from all specific gravity ratings.

New York table 5. Potato variety trial, Wainscott, Long Island, New York, 1964.
(6 replications, 15-foot plots, and 9" and 12" spacing).

Pedigree		Yield Per Acre			No. of Tubers Over 2½"/90'	Wt./Tuber Over 2½"	Specific Gravity
		Total	Over 2½"	Over 2½"			
		Cwt.	Cwt.	Pct.			
Katahdin	9"	369	306	83	466	.41	71
	12"	330	270	82	383	.44	
NY-1	9"	336	238	71	411	.36	81
	12"	341	264	77	432	.38	
NY-2	9"	344	253	74	421	.37	82
	12"	293	204	70	365	.35	
NY-14	9"	361	202	56	372	.34	81
	12"	272	192	71	378	.32	

LSD .05 =30

1/ 1.0 omitted from all specific gravity ratings.

New York table 6. Potato variety trial, Wainscott, Long Island, New York, 1964.
(6 replications, 30-hill plots, and 12" spacing).

Pedigree		Yield Per Acre			No. of Tubers Over 2½"/180'	Wt./Tuber Over 2½"	Specific Gravity
		Total	Over 2½"	Over 2½"			
		Cwt.	Cwt.	Pct.			
NY-3		256	182	71	579	.39	76
4		340	280	82	782	.45	73
5		298	205	68	678	.38	79
6		445	349	78	1031	.42	73
7		279	223	80	644	.43	73
9		257	197	77	558	.44	72
10		310	208	67	631	.41	81
11		279	142	51	481	.37	73
12		295	158	54	542	.36	82
13		293	220	75	720	.38	82
15		271	213	79	661	.40	65
16		329	288	87	744	.48	69
17		270	200	74	639	.33	76
18		277	175	63	591	.36	85
19		342	274	80	797	.42	76
20		372	314	84	897	.43	78
B4494-6		316	270	85	751	.45	77
Russet Burbank		287	201	70	531	.47	80
Avg. 2 Kats		327	273	83	767	.45	71
LSD	.05		44		144		06

1/ 1.0 omitted from all specific gravity ratings.

New York table 7. Potato variety trial, Allegany County, New York, 1964.
(4 replications, 25-hill plots, and 12" spacing).

Pedigree	Yield Per Acre			No. of Tubers Over 2½" 11/100'	Wt./Tuber Over 2½"	Specific Gravity ^{1/}
	Total	Over 2½"	Over 2½"			
	Cwt.	Cwt.	Pct.			
NY-1	335	262	78	491	.37	1.086
2	337	286	85	491	.40	1.091
3	274	228	83	410	.38	1.093
4	371	347	93	471	.50	
5	336	291	87	504	.39	1.086
6	376	314	83	564	.38	1.081
7	276	254	92	370	.47	1.084
9	272	237	87	385	.42	1.086
10	304	224	73	436	.35	1.079
11	315	206	65	412	.34	1.084
12	289	142	49	329	.30	1.092
13	273	227	83	366	.43	1.087
14	306	263	86	471	.39	1.085
15	282	249	88	414	.42	1.077
16	335	315	94	455	.48	1.075
17	296	223	75	386	.39	1.089
18	321	251	78	459	.38	1.098
19	352	299	84	494	.42	1.087
20	337	262	77	488	.37	1.081
B4494-6	339	311	98	427	.50	1.082
Avg. 2 Kats	317	280	88	436	.44	1.080
LSD .05		=50		84		.006

^{1/} 1.0 omitted from all specific gravity ratings.

New York table 8. Potato variety trial, Oneida County, New York, 1964.
(4 replications, 50 hills, and 12" spacing).

Pedigree	Yield Per Acre			Wt. Per Tuber Over 2½"	Specific Gravity ^{1/}
	Total	Over 2½"	Over 2½"		
	Cwt.	Cwt.	Pct.		
Katahdin	199	159	79	.52	61
NY-1	243	193	79	.52	73
6	255	172	67	.45	67
11	205	113	55	.39	68
14	309	232	75	.48	77
16	298	264	89	.63	68
18	138	45	33	.29	70
LSD .05		53			

^{1/} 1.0 omitted from all specific gravity ratings.

New York table 9. Potato variety trial, Orleans County, New York, 1964^{1/}
(6 replications, 30-foot plots, and 9" spacing).

Pedigree	Yield Per Acre			Sunburn	Culls	Jumbo	Hollow Heart per jumbos
	Total	Over 1 7/8"	Over 1 7/8"				
	Cwt.	Cwt.	Pct.	Pct.	Pct.	Pct.	
NY-1	311	269	86	.8	.4	.3	0/1
2	301	272	90	1.1	1.8	.5	0/2
3	278	258	92	.6	3.5		
4	382	324	85	2.2	6.3	.8	1/1
5	302	265	88	3.2	1.2		
6	373	318	85	3.5	2.7		
7	266	228	85	1.5	2.3	5.3	2/14
9	260	230	89	3.0	1.3		
11	338	268	79	.7	1.8		
12	242	187	77	2.9	3.5		
13	317	278	87	2.4	4.0	1.0	1/3
14	321	294	91	.7	.3		
15	287	265	92	1.0	.6	1.7	2/5
16	387	349	90	3.7	1.8	3.5	11/12
17	251	222	88	1.1	2.2		
Ona	321	279	87	2.2	2.7	.6	1/2
F2474	234	206	88	1.8	3.2	2.0	1/5
Reliance	305	250	82	2.0	2.6	.3	0/1
Katahdin	357	305	85	2.8	.9	2.2	3/8
Katahdin	342	312	91	2.3	.7	1.2	0/3

LSD .05 $5.54 \times 4.8 = 26.59$

^{1/} Cooperative with Dr. E. E. Ewing and Ken Stone

New York table 10. Potato variety trial, Steuben County, New York, 1964^{1/}

Pedigree	Yield Per Acre			Specific Gravity ^{2/}
	Total	Over 1 7/8"	Over 1 7/8"	
	Cwt.	Cwt.	Pct.	
NY-1	210	189	90	82
4	256	235	92	77
5	232	216	93	82
7	172	155	90	80
9	203	199	98	79
12	221	205	93	89
14	233	215	92	81
15	197	190	96	74
16	244	244	98	72
17	219	205	94	88
18	211	197	93	89
Katahdin	206	184	89	75

^{1/} Wise Potato Chip Company.

^{2/} 1.0 omitted from all specific gravity ratings.

New York table 11. Potato variety trial, Wyoming County, New York, 1964^{1/}
(6 replications, 30-foot plots, and 9" spacing).

Pedigree	Yield Per Acre			Sunburn	Cells
	Total	Over 1 7/8"	Over 1 7/8"		
	Cwt.	Cwt.	Pct.	Pct.	Pct.
R Rural	254	238	94	-	2.8
Katahdin	291	261	90	7.9	.1
Pennchip	286	266	93	2.4	1.1
NY-1	294	271	92	3.3	1.1
2	300	289	96	.9	.5
4	351	289	82	6.5	10.7
5	268	246	92	6.5	1
6	354	319	90	6.7	1.4
7	262	244	93	1.5	2
9	256	233	91	5.9	1.4
10	309	291	94	2.5	.9
11	295	272	92	2.8	1.4
12	267	242	91	3.2	.3
13	298	282	95	2	1.7
14	287	276	96	.6	.3
15	284	276	97	.6	.1
16	324	314	97	.5	1.1
17	279	254	91	8.0	.5
18	227	212	93	.9	1.2
B4494-6	256	240	94	.2	1.6
LSD .05		34			

^{1/} Cooperative with Dr. E. E. Ewing and Jean Ketchum.

NEW YORK (Long Island)

R. L. Sawyer 1/

There were 36 entries in the early planting of potato varieties in 1964. Shortly after planting, a period of heavy spring rains considerably decreased yield potential in relation to later plantings. Long Island, normally an area requiring supplemental irrigation, was on complete irrigation for a major portion of the growing season after come up.

MATERIAL AND METHODS:

Planting Date:	April 2, 1964	Harvest Date:	August 25, 1964
Variety:	36 entries		
Fertilization:	175 lbs. of N, 350 lbs. P_2O_5 , 175 lbs. K_2O per acre		
Cultivation:	5 cultivations and weedings		
Irrigation:	6 applications of 1 inch		
Plot Size:	Single row, 30 feet long		
Statistical Design:	Randomized block, 6 replications		

Results:

The best indicator as to how the yield results compare with previous years is to look at Katahdin. The yield is less than 300 Cwt per acre for this planting, indicating that the early planting was considerably less than for a normal season. Later plantings of Katahdin yielded much higher.

Ona, a late maturing variety, which is resistant to "early die-down" gave the highest yield. Kennebec is normally one of the best yielding varieties, however, this year it was lower than Katahdin.

Keswick looked much better than any of the other early varieties. Cobbler was very poor and also Fundy. In a spacing-fertilizer test with Fundy, it produced very poorly at all combinations. If Fundy does this only one year in four, it is not a variety for Long Island.

All of these varieties are being checked for storage, processing and cooking quality. The results are arranged in order of yield in Sawyer table 1.

Storage results for the 1963 crop reported in the Thirty-Fourth Annual Report to Cooperators are given in table 2. Kennebec continued to be at or near the top in chipping quality and yield. Marygold and Teton had good yields but were low in specific gravity and chipping color. Penobscot had a good yield and specific gravity but had a high shrinkage in storage and was highly susceptible to black spot. Seedling B751-119 had a good specific gravity, chipping color and yield but was medium in storage quality.

1/ Paper No. 518, Department of Vegetable Crops, Cornell University, Ithaca, N. Y.

Sawyer table 1. Field results from the early planting of potato varieties, Long Island, New York, 1964.

Variety	Yield Per Acre		Variety	Yield Per Acre	
	U.S.No.1	U.S.No.1 2-3½"		U.S.No.1	U.S.No.1 2-3½"
	Cwt.	Cwt.		Cwt.	Cwt.
Ona	361	338	NUR-20	269	258
NY B4494-6	325	287	Marygold	263	253
Keswick	320	281	Chippewa	258	237
Teton	316	296	57G16-78	251	246
NHH-2A	314	297	Penobscot	247	241
B69-16	305	263	B4472-4	243	231
Green Mountain	301	282	B4537-9	238	231
B751-119	298	279	B3478-45	232	224
Katahdin	296	269	56N71-1	227	218
NIL-1	296	274	Cobbler	226	220
Kennebec	289	275	5G15-63S	222	219
Alleghanna	287	242	NII-2	221	217
Shoshoni	282	257	57G3-82	216	210
Pennchip	281	269	57G10-6A	192	191
57G5-24	278	265	Russet Burbank	182	174
47156	277	255	B4523-10	172	171
56N-171-3	276	262	Fundy	145	140
NGK-2B	274	259	B3556-11	156	153
LSD 5%					

Sawyer table 2. Storage results from the 1963 trials reported in the thirty-fourth Annual Report (page 136).

Variety	Yield Per Acre		Shrink	Gms.Sprouts Kilo/Tuber	Agtron Chip Col.	Storage 1/ Spec.Gravity	Black Spot
	U.S.No.1	2-3½"					
	Cwt.	Cwt.	Pct.				
Kennebec	399	191	8.9	13	39	72	20
Marygold	388	245	8.8	15	31	69	29
Teton	372	212	8.3	18	32	67	17
Green Mountain	368	292	9.1	21	29	83	28
Penobscot	353	207	15.2	39	37	82	47
Keswick	350	176	7.8	17	33	72	21
Emmet	343	196	7.5	10	32	72	9
B3478-45	340	274	6.9	14	33	73	13
Katahdin	338	166	7.6	12	40	68	16
Chippewa	337	190	8.4	13	36	62	14
Plymouth	337	188	7.7	14	36	68	14
B3453-2	331	222	10.1	16	35	72	23
B69-16	331	238	6.3	9	30	72	17

continued

Sawyer table 2, continued.

B751-119	326	255	13.8	27	39	81	30
B3556-11	322	260	10.6	23	33	82	43
47156	316	159	9.0	14	37	77	25
Fundy	309	170	9.1	24	33	66	8
Russet Burbank	309	280	10.0	13	34	78	16
Ona	301	203	10.1	18	35	71	18
Cobbler	300	224	8.6	21	36	66	16
Snowflake	299	202	6.4	12	36	66	3
Avon	293	198	9.6	19	40	68	12
B3353-9	293	248	7.6	11	33	59	14
B4159-2	268	241	11.1	23	33	68	17
Aranac	252	191	8.2	14	37	77	12
B4818-11	241	202	10.2	24	37	76	33
Early Gem	238	188	6.5	9	27	59	11
LSD 5%	30	23	2.6	3.6	3.8	.0024	12

1/ 1.0 omitted from all specific gravity ratings.

NEW YORK (Long Island)
R. C. Cetas and S. S. Leach

Evaluation of Potato Breeding Lines for Resistance
To Early Maturity Wilt on Long Island in 1964

Cooperators: Robert V. Akeley, USDA, ARS, Crops Research Division, Beltsville, Maryland, and Austin Warner, Riverhead, New York.

Location: Farm of Austin Warner, Riverhead, New York. Test was conducted on land known to be infested with the organisms (Verticillium albo-atrum, Fusarium sp., Pratylenchus sp.) that cause early maturity wilt on Long Island.

Soil type: Sassafras sandy loam, a light soil low in organic matter.

Plot size: Ten hills spaced about 12 inches apart, non-replicated. Each 10-hill plot was separated by a hill of Red Pontiac.

Planted: April 13, 1964. Since the plots were located at the end of 2 rows in a commercial field, the grower-cooperator marked the rows and fertilized the plots with his potato planter while planting the field. The seed pieces were cut just before planting and were not treated with a fungicide. The seed pieces were planted by hand using a "bell" planter.

Fertilizer: Same as used by grower, and at the same rate.

Previous crop: Potatoes for at least the past 12 years. Rye cover crop planted each fall and plowed down each spring.

Selections and varieties: Twenty-eight USDA selections and 6 named varieties: Green Mountain, Chippewa, Ona, Irish Cobbler, Pontiac, and Fundy. Pungos were planted on each side of the plots. The Onas were from Minnesota, and the seed tubers had considerable black spot. Therefore, small whole seed of this variety was used. Most lots consisted of either all cut seed pieces, or a combination of cut seed and small whole seed.

Data: Notes were taken on vine condition on July 29 and again on August 20 when the plots were harvested. The plots were dug by hand and total yield of tubers determined. Specific gravity was determined by use of a potato hydrometer. Following harvest, the tubers were stored in half-bushel baskets in a barn at normal air temperatures. On September 29, the tubers were washed and sorted into 2 classes: over, and under 2 inches in diameter. Those over 2 inches in diameter were weighed, scored for scab, pinkeye, and stem-end discoloration. The method described by Cetas and Jones in 1962 (P.D.R. 46:601-605) was used in scoring the tubers for scab. Pinkeye was rated as follows: 0- None, 1- trace or confined to eye; 2- lesions extended beyond eyebrow but had not coalesced with adjacent lesions from eyes in apical end, 3- lesions from eyes in apical end coalesced, 4- lesions from eyes in middle of tuber coalesced with those from apical eyes. Stem-end discoloration was divided into two classes: yellow to light or medium brown, believed to be caused by Verticillium albo-atrum, and dark brown or black woody strands, believed to be caused by Fusarium solani f. eumartii. Each type was rated on a scale of 0 to 6 in the following manner: 0- no discoloration, 1- trace,

2- 1 to 6 percent of vascular ring discolored, 3- 6 to 12 percent of vascular ring discolored, 4- 12 to 25 percent of vascular ring discolored, 5-, 25 to 50 percent of vascular ring discolored, 6- 50 percent or more of the vascular ring discolored when the tuber was clipped about 1/8 inch above the stolon attachment; about where the vascular ring becomes parallel to the long axis of the tuber. On November 3, the tubers were scored for sprouting: - no sprouting, + evidence of sprouting. On November 3, samples of Ona, B-5063-3, B-5089-17, B-5132-3, B-5090-11, B-5147-12, B-5052-7, B-5030-10, B-4987-34, and B4846-14 were placed in 40° F. storage for chipping and black spot determinations at a later date.

Results: The results (Cetas tables 1, 2, and 3) indicated that Ona, B-4846-14, B-4987-14, B-5030-10, B-5052-7, B-5063-3, B-5089-17, B-5090-11, B-5132-3, and B-5147-12 were at least partly resistant to early maturity wilt. Of these, B-5132-3 appeared to be the most resistant based on vine growth, yield, pinkeye, and stem-end discoloration data. Although B-5090-11 died early and produced tubers with considerable stem-end discoloration, the total yield was equal to Ona, and the yield of tubers 2 or more inches in diameter was greater than Ona. The chief disadvantages of B-5090-11 were low specific gravity, and the relatively high incidence of stem-end discoloration. Its shape and skin texture, however, were satisfactory; similar to Chippewa. Tubers of B5132-3 were similar to Ona in size, shape, and skin texture; but were lower in specific gravity, and were less affected by stem-end discoloration, especially the dark brown to black type caused by F. solani f. eumartii. The lack of sprouting following approximately 11 weeks of storage at normal air temperature in a barn indicates that B5132-3 has a long rest period and may be suitable for long term storage.

Cetas table 1. Condition of vines on July 29 and August 20 of potatoes grown in soils infested with organisms that cause early maturity wilt.

Variety or Selection	Vine condition 7/29	Vine condition 8/20
Chippewa	Dead	Dead
Cobbler	Dead	Dead
Fundy	Dead	Dead
Green Mountain	Some green and wilted	Dead
Ona	Mostly green, trace of wilting & yellowing	Green
Pontiac	Some green foliage	Dead
B4744-23	Some green foliage	Dead
B4808-3	Dead	Dead
B4808-19	Nearly Dead	Dead
B4809-7	Dead	Dead
B4828-4	Dead	Dead
B4829-7	Dead	Dead
B4845-4	Yellow and wilted	Dead
B4846-2	Nearly Dead	Dead
B4846-14	Mostly green, brown vascular bundles	Green
B4986-15	Dead	Dead
B4987-34	Mostly green	Green
B5000-18	Nearly Dead	Dead
B5006-6	Dead	Dead
B5006-15	Dead	Dead
B5011-17	Partly green	Dead
B5030-10	Green, but wilting, trace of yellow	Dead

continued

Cetas table 1, continued.

B5031-18	Dead	Dead
B5036-40	Nearly Dead	Dead
B5052-7	Mostly green, trace of wilting & yellowing	Green
B5052-14	Dead	Dead
B5063-3	Mostly green, strong upright plants	Partly green
B5066-3	Dead	Dead
B5088-7	Dead	Dead
B5089-17	Mostly green, some wilting and yellowing	Green
B5090-11	Dead	Dead
B5132-3	Mostly green, weak, decumbent plants	Partly green
B5141-6	Partly green	Dead
B5147-12	Mostly green, weak, decumbent plants	Partly green

Cetas table 2. Yield and specific gravity of tubers of potatoes grown in soils infested with organisms that cause early maturity wilt.

Variety or Selection	No. of Hills	Total Weight Lb.	Pounds over 2" screen	Specific gravity
Chippewa	10	14.5	7.6	55
Cobbler	8	9.5	3.3	55
Fundy	3	2.5	0	1/
Green Mountain	10	15.0	7.1	65
Ona	10	20.5	12.8	66
Pontiac	10	16.0	8.3	55
B4744-23	10	14.75	6.5	67
B4808-3	10	12.0	5.4	55
B4808-19	10	9.0	5.4	55
B4809-7	10	16.5	6.8	55
B4828-4	10	11.75	4.6	55
B4829-7	10	14.75	8.7	55
F4845-4	10	14.0	4.6	64
B4846-2	10	15.5	0	67
B4846-14	10	19.5	8.0	78
B4986-15	10	11.0	6.0	55
B4987-34	10	16.5	5.7	65
B5000-18	10	16.75	7.0	55
B5006-6	10	6.5	1.2	1/
B5006-15	10	16.5	7.6	55
B5011-17	10	12.0	3.8	55
B5030-10	10	18.5	6.3	70
B5031-18	10	9.75	0.7	61
B5036-40	10	17.0	5.6	55
B5052-7	10	14.0	9.4	58
B5052-14	10	11.0	4.7	55
B5063-3	10	19.0	8.2	75
B5066-3	10	11.0	5.0	55
B5088-7	10	12.5	4.5	55
B5089-17	10	20.0	7.7	63

continued

Cetas table 2, continued.

B5090-11	10	21.25	14.1	55
B5132-3	10	21.0	14.3	58
B5141-6	10	15.75	7.3	76
B5147-12	10	15.0	8.7	66

1/ 1.0 omitted from all specific gravity ratings.

2/ Not enough tubers for a test.

Cetas table 3. Disease indices of potatoes grown in soils infested with organisms that cause early maturity wilt.

Variety or Selection	Disease Indices				Sprouted on Nov.3
	Scab	Pinkeye	Stem-end Discolorations		
			Brown	Black	
Chippewa	2.40	0.20	1.10	0.27	+
Cobbler	1.72	0.57	4.14	0.00	-
Fundy	0.00	0.00	0.00	0.00	-
Green Mountain	1.48	0.03	0.82	0.19	-
Ona	0.24	0.06	0.21	0.94	-
Pontiac	1.88	0.00	0.70	0.09	-
B4744-23	1.08	0.00	0.08	0.00	-
B4808-3	0.42	0.00	0.21	0.21	-
B4808-19	2.76	0.19	3.00	0.71	-
B4809-7	0.00	0.04	0.92	0.08	-
B4828-4	0.00	0.13	1.80	0.00	+
B4829-7	2.24	0.00	0.46	0.03	-
B4845-4	4.00	0.00	0.80	0.00	-
B4846-2	0.00	0.15	1.82	0.93	+
B4846-14	0.00	0.14	1.45	0.41	+
B4986-15	0.53	0.26	0.47	0.00	-
B4987-34	0.00	0.00	1.48	0.08	+
B5000-18	1.22	0.07	0.54	0.32	-
B5006-6	0.14	0.00	1.43	0.43	+
B5006-15	2.79	0.00	0.63	0.21	-
B5011-17	5.25	0.13	1.44	0.31	+
B5030-10	1.60	0.00	1.40	0.05	-
B5031-18	1.29	0.07	2.29	0.08	-
B5036-40	0.09	0.39	2.48	0.39	+
B5052-7	1.63	0.04	1.00	0.25	+
B5052-14	0.82	0.53	2.12	0.12	+
B5063-3	10.45	0.00	0.00	0.07	-
B5066-3	0.00	0.58	1.29	0.17	-
B5088-7	1.78	0.50	1.95	0.33	-
B5089-17	0.55	0.07	0.41	0.35	+
B5090-11	0.62	0.13	0.71	0.44	+
B5132-3	0.20	0.00	0.04	0.14	-
B5141-6	2.57	0.00	0.89	0.07	+
B5147-12	0.22	0.00	0.22	0.41	+

NORTH CAROLINA

F. L. Haynes

The potato breeding program is being directed more toward the production of new varieties for the Coastal Plain area with less emphasis on varieties for the mountains. Outfield testing is conducted at four locations in the eastern area, while the evaluation of breeding lines in the mountains is being confined to one location in addition to the seed maintenance and increase at the Upper Mountain Station. There are two primary reasons for this concentration of effort. First, the commercial acreage of potatoes in the mountains has been reduced to the point where it is of very minor importance and the prospects for any revival of the industry are much poorer than for the Coastal Plain. Secondly, several existing varieties are adapted to this area while the eastern industry is in dire need of better early varieties.

Primary performance trials for the eastern area were conducted at the Tidewater Station, Plymouth, N. C. The planting included 161 lines and the Scab Nursery. Results of scab resistance evaluation are presented in North Carolina table 4. Those lines surviving the primary evaluations are placed in the advanced trials at one or more of three locations in the commercial area. Results of the current advanced trials are presented in North Carolina tables 1-3.

The breeding lines 50B33-3, 56C18-10 and 54W14-1 continue to exhibit outstanding appearance, earliness, and chipping quality. Selection 54W14-1 is resistant to common scab and is very high in dry matter by eastern North Carolina standards. None of these has been consistently outstanding in yields, however. Selection 58C20-8 a high yielding, early scab resistant line produces poor chips.

The trials in the mountains at Fletcher were located in a river valley which flooded in the early season. All plots at that location were a total loss. Our contribution to the Eastern Regional Trials was a casualty of this flood.

North Carolina table 1. Potato performance trial at Aurora, North Carolina. Plots 1/196 acre, 4 replications. Planted 3/11/64, harvested 6/18/64. Spacing: 10-inch hills, 40-inch rows. Fertilized 2075 lb/A 8-8-8.

Variety	Ave. Yield US No. 1-A		Specific Gravity	Maturity
	Cwt/A	Percent of Total		
Pungo	234	94	1.069	Midseason
58C20-8	210	89	58	Early
Irish Cobbler	207	88	73	Medium Early
58C19-2	197	89	68	Medium Early
55C13-3	193	86	69	Early
Katahdin	189	89	58	Medium Late
LaChipper	164	90	69	Early
56C18-10	160	88	60	Early
Avon	152	91	70	Midseason
54W14-1	146	89	79	Early
50B33-3	146	92	65	Early
60C9-31	121	82	58	Medium Early
Fundy	119	90	76	Early
60C9-69	102	87	54	Early
Emmet	77	89	60	Midseason
Arenac	71	80	69	Midseason
LSD .05	39			
.01	52			
C.V. for yield = 17.6%				

North Carolina table 2. Potato performance trial at Columbia, North Carolina.

Plots 1/196 acre, 4 replications. Planted 3/28/64, harvested 7/10/64. Spacing: 10-inch hills, 40-inch rows. Fertilized 2600 lbs/A 5-10-10.

Variety	Ave. Yield US No. 1-A		Specific Gravity	Maturity
	Cwt/A	Percent of Total		
Pungo	407	94	1.072	Midseason
Katahdin	344	94	66	Medium Late
58C20-8	322	92	63	Early
Irish Cobbler	293	92	78	Medium Early
58C19-2	281	95	66	Medium Early
LaChipper	270	96	71	Early
55C13-3	263	93	69	Early
60C9-31	248	92	60	Midseason
54W14-1	237	94	83	Early
56C18-10	237	93	64	Early
Avon	210	94	72	Medium Early
50B33-3	202	95	64	Early
Fundy	161	94	73	Early
60C9-69	151	94	59	Early
Emmet	142	94	69	Midseason
Arenac	128	90	72	Midseason
LSD .05	56			
.01	75	C.V. for yield = 16.2%		

North Carolina table 3. Potato performance trial at Belcross, North Carolina. Plots 1/196 acre, 4 replications. Planted 3/10/64, harvested 6/27/64. Spacing: 10-inch hills, 40-inch rows. Fertilized 2600 lb/A 5-10-10.

Variety	Ave. Yield US No. 1-A		Specific Gravity	Maturity
	Cwt/A.			
Pungo	318		1.088	Midseason
Irish Cobbler	297		85	Medium Early
58C19-2	289		91	Medium Early
Katahdin	265		80	Medium Late
58C20-8	264		74	Early
54W14-1	257		92	Early
55C13-3	256		80	Early
56C18-10	248		75	Early
LaChipper	244		79	Early
60C9-31	240		81	Midseason
60C9-106	207		70	Medium Early
Fundy	196		85	Early
Avon	195		81	Medium Early
60C9-116	194		79	Early
50B33-3	180		76	Early
Ona	178		75	Midseason
60D1	130		79	Midseason
LSD .05	44			
.01	59	C.V. for yield = 13.3%		

North Carolina table 4. Scab nursery test. Tidewater Station, Plymouth, North Carolina. Readings are from two replications. Irish Cobbler used as check variety.

Variety	Variety Reading	Check Reading	Variety	Variety Reading	Check Reading
49B13-2	4-3	5-5	62C4-12	3-3	4-5
55C13-3	2-4	3-5	62C4-29	4-5	5-5
55C13-6	1-2	3-5	62C4-47	4-2	5-5
56C12-12	5-5	5-5	62C4-51	2-4	5-5
56C12-15	5-5	5-5	62C4-56	2-1	5-5
58C5-39	3-3	5-5	62C4-59	3-3	5-5
58C5-48	3-3	5-5	62C4-61	4-5	5-5
58C19-2	T-1	3-4	62C4-63	3-5	5-5
58C20-8	1-4	5-5	62C4-70	3-2	5-5
59C15-1	5-5	5-5	62C4-72	2-3	5-5
60C9-20	4-3	5-5	62C4-82	1-2	2-5
60C9-22	3-5	5-5	62C4-86	2-3	3-5
60C9-49	1-1	5-5	62C4-88	2-2	5-5
60C9-58	4-5	5-5	62C4-89	2-5	5-5
60C9-61	1-3	4-5	62C4-96	3-5	5-5
60C9-69	2-4	3-5	62C4-97	3-2	5-5
60C9-71	3-5	3-5	62C4-102	4-2	5-5
60C9-72	3-3	4-5	62C5-14	5-5	5-5
60C9-78	2-2	4-5	62C5-21	2-2	5-5
60C9-93	2-3	4-5	62C6-1	4-3	5-5
60C9-106	T-1	4-5	62C6-13	5-4	5-5
60C9-116	1-1	1-4	62C6-18	5-5	5-5
60C10-3	3-5	2-5	62C6-37	5-4	5-5
62C2-3	5-5	5-5	62C7-1	2-4	5-5
62C2-8	5-5	5-5	62C7-5	2-5	4-5
62C2-11	2-4	5-5	62C7-6	3-4	4-5
62C2-19	3-5	4-5	62C7-11	5-3	5-5
62C2-20	2-5	4-5	62C7-13	5-5	5-5
62C2-24	3-5	4-5	62C7-19	4-4	5-5
62C2-28	2-2	5-5	62C7-38	5-5	5-5
62C2-31	2-3	5-5	62C8-3	4-4	5-5
62C2-33	2-4	5-5	60D3	5-5	5-5
62C2-47	3-5	5-5	54W14-1	2-3	5-5
62C4-6	T-1	2-5	Avon	3-4	4-5
62C4-7	0-0	4-5	Navajo	4-2	5-5
62C4-10	5-5	4-5			

NORTH DAKOTA
R. H. Johansen

The development of potato varieties that are productive have resistance to certain diseases, possess wide adaptability to other potato-producing areas and have superior table, market, and processing quality.

Potato Crossing Program. Three hundred and sixty-two potato crosses were made in the greenhouse during February and March, 1964. Objectives in crossing were to combine good tuber type, good red color and high yield with disease resistance, processing qualities and high specific gravity. Seed balls were harvested from the parent plants in May and the true seed was extracted during June.

Greenhouse and Field Seedlings. Over 30,000 seedlings were grown in the greenhouse during 1964. Seedlings were transplanted into three inch clay pots during July and August and harvested during November. Excellent seedling tuber size was achieved in 1964.

At the Langdon Experiment Station approximately 25,000 seedlings representing 214 families were planted in the field. Seedlings were planted on the 18th and 19th of May and harvested the 14th and 15th of September. Over 2000 clones were saved at harvest for further study and evaluation.

Advanced Selections. Advanced selections were again grown under isolation from viruses and other diseases at the Langdon Experiment Station. Most of the third year and older material had previously been indexed in the greenhouse. Selections were planted at Langdon on May 20 and harvested on September 16 and 17.

To control insects at Langdon, Thimet, a systemic insecticide, was applied in band form at planting time. In addition to the Thimet, all plots were sprayed regularly during the season with Endrin. Although little or no disease was noted at Langdon during the season, all plots were rogued at least once every two weeks.

Application for seed certification was made on nine promising advanced selections. Field inspections were made by personnel from the North Dakota State Seed Department, who, in addition to regular inspections of the field, also assisted with the roguing and maintaining of disease-free plots.

Duplicate plantings of all advanced selections were planted in scab and adaptation plots at Grand Forks and Fargo. The Grand Forks plot was planted on May 6 and harvested on September 8 and 9. To obtain additional data, a scab and general adaptation plot were planted for the first time at Glyndon, Minnesota.

Progeny testing of several hundred clones was again conducted at Grand Forks, North Dakota and Baton Rouge, Louisiana. The purpose of this experiment was to study the effect of environment on the genetic behavior of potato progenies. At Baton Rouge single plots of 96 clones were planted in January and harvested May 12. The Grand Forks plot consisted of 184 clones replicated two times in a randomized block. The Grand Forks plot was planted May 6 and harvested on September 21st. In addition, an increase plot consisting of several promising Louisiana and North Dakota clones was planted at Grand Forks. Specific gravity, maturity, vigor and tuber characteristics were recorded on clones grown in these trials. Further testing of these clones will be done in cooperation with the Department of Horticulture, Louisiana State University, Baton Rouge, Louisiana.

Promising Selections. Over thirty promising advanced selections were distributed in lots of one to five tubers to foundation growers located at Beach and several counties in eastern North Dakota. Most of the selections increased by these growers will be replanted next year.

Advanced selections showing varietal promise in 1964 are found in North Dakota table 1. All of these selections have been tested for at least three years. At the present, the most promising selections appear to be ND 5899-1, ND 5886-2, ND 5778-2R, ND 5488-11 Russet and ND 4524-4R. ND 5899-1 and ND 5886-2 are both early in maturity and have excellent chipping quality. ND 5778-2R is a high yielding red with good type and color. ND 5488-11 Russet is a russet skin selection with high specific gravity and good chipping quality. ND 4524-4R is similar in color and shape to its sister selection ND 4524-7R, however, ND 4524-4R is not susceptible to internal necrosis and has good culinary qualities.

Several second year selections showed outstanding horticultural characteristics when grown for the first time in five-hill plots at Langdon and Grand Forks. Many russet and red skinned selections appeared especially promising.

A summary of selections grown and saved for further study follows:

<u>Year</u>	<u>No. planted</u>	<u>No. saved</u>
First year field seedlings	25,000	2500
ND 2nd year	677	304
ND 3rd year	98	51
ND 4th year	87	56

Freeze Drying of Potato Pollen. Experiments involving the freeze drying of potato pollen were done in cooperation with Dr. J. R. King, Department of Horticulture, Louisiana State University. Freeze drying experiments were carried out by the use of a 10-145 Vir Tis Freeze Dryer at Louisiana State University and by a 10-140 Vir Tis Freeze Dryer at North Dakota State University. Freeze dried samples of pollen were sent to North Dakota in May, 1963 to be used in cross-pollination during the 1964 season. In March, 1964, 20 pollinations were made by using f-d pollen that was approximately nine to ten months old. From this experiment five out of these twenty cross-pollinations resulted in seed ball set.

At North Dakota State University samples of pollen were freeze dried in March, 1964 and used in cross-pollination approximately three weeks later. Fertilization was achieved in seven out of fifteen cross-pollinations. Pollen was collected in the field during the summer and freeze dried. This pollen will be used in the crossing program during 1965.

Potato Variety Trials. Replicated variety trials were conducted at Grand Forks, Park River, Minot, Williston and Carrington. Trials were grown under irrigation and non-irrigation at Williston and Carrington. Trials in western North Dakota at Williston and Minot were conducted by Supts. E. French and G. Geiszler. The Carrington trial was conducted by Howard Olson. In the trials grown in the Red River Valley, County Agent, Robert Amstrup, was in charge of general maintenance of the Park River trial and Harry Earl, Farm Manager of the Red River Valley Potato Research Farm, was in charge of the Grand Forks trial.

The varieties were grown in plots of 25 hills and replicated four times in a randomized block. Number of entries grown in trial consisted of 17 at Grand Forks and Park River, 16 at Carrington and 15 at Minot and Williston.

Tubers from all plots were harvested and weighed to obtain total and marketable yield. Marketable yield consisted of all tubers of U. S. No. 1 quality over two inches in diameter. Specific gravity was determined by the use of a potato hydrometer.

Spacing, fertilizer, soil type, planting date and harvest date of each location follows:

Location	Spacing Row Plants		Fertilizer Applied	Soil Type	Planting Date	Harvest Date
Grand Forks	38"	12"	400#/A 16-16-8	Bearden Clay Loam	5/4	9/20
Park River	36"	12"	200#/A 16-16-8	Glyndon Silt Loam	5/8	9/22
Minot	42"	14"	none	Williams Loam	5/15	9/17
Williston dryland	42"	12"	50#/A 16-48-0	Williams Loam	5/7	9/10
Williston irrigation	36"	12"	50#/A 16-48-0	Clay Loam	5/14	9/17
Carrington dryland	36"	1.1"	400#/A 20-20-10	Loam	5/5	9/11
Carrington irrigation	36"	.8"	500#/A 20-20-10	Loam	5/13	9/10

The 1964 season was generally quite dry during planting time in May but extremely wet during all of June. For example, the total rainfall at all locations was less than 3 inches in May but over 7 inches in June. July was quite dry at all locations with August showing near normal precipitation. Over sixteen inches of precipitation was reported at all locations. Carrington with 19.6 inches recorded the highest precipitation followed by Grand Forks with 17.0 inches. To supplement rainfall, approximately nine inches of irrigation water was applied during July and August at Carrington. At Williston the plot was irrigated twice during the season.

For the most part, temperatures during May and July were warm while June and August were quite cool. The cool, dry weather that occurred shortly after planting no doubt was responsible for the poor plant stands recorded at Minot and Williston. Above normal temperatures occurring during the last 3 weeks in July depressed growth and caused a reduction in set and yield.

The yield of varieties and selections grown in trial was the lowest recorded for the past 5 years. The only locations having slightly higher yields than in previous years were Minot and Park River. Under dryland conditions, Park River produced the highest average marketable yield. The yield at Carrington was quite similar to the 1963 season with yields at Grand Forks and Williston being much below normal. In spite of the heavy rainfall during June, the irrigated trial at Carrington had an average yield of 146 hundredweight more than the dryland trial. The drouth condition occurring the latter part of July was detrimental to the dryland trial. Due to poor stand no yield was calculated for the irrigated trial grown at Williston.

As in past years, Red Pontiac, Red LaSoda, Kennebec, LaRouge and Viking produced the highest average marketable yield (North Dakota table 2). Little or no significant differences in yield were noted for these 5 varieties. Bounty did not produce yields as high as in previous years.

Other varieties producing satisfactory yields were Cobbler, Bounty and Norgold Russet. Norgold Russet again produced higher yields than the other two russet varieties, Early Gem and Russet Burbank. When comparing yields of the red-skinned sister selections involving the progeny number ND 4524, ND 4524-4R and ND 4524-7R produced higher marketable yields than ND 4524-16R. No significant difference in yield was noted for ND 4524-7R and ND 4524-4R. LaChipper and Snowflake produced disappointingly low yields in the 1964 trial. In general, the early maturing varieties produced the lowest yield and this may be attributed to the hot, dry weather that occurred at a critical growing period during late July.

Percent total solids were again quite high in 1964 (North Dakota table 3). Cobbler with an average of 21.2 percent solids was the highest entry in trial. Other selections producing high solids were Russet Burbank, Kennebec, Norgold Russet, Snowflake, Bounty and Viking. All of these varieties produced an average total solids of 19.7 percent or higher. Early Gem, Norland and Red Pontiac were again found to produce the lowest percent total solids. ND 4524-4R produced solids lower than ND 4524-16R but higher than ND 4524-7R.

Varieties grown in trial under dryland at Williston and Grand Forks produced the highest percent total solids. In the dryland vs. irrigation trials at Williston, all varieties with the exception of Norland produced higher total solids when grown under dryland conditions. At Carrington little or no significant difference was found in total solids of varieties grown under dryland and irrigation.

Common and russet scab was not a serious problem for varieties grown at Grand Forks, however, a fairly higher incidence of russet scab was found at Park River. Superior, Norgold Russet and Early Gem were found to have the highest degree of resistance to both types of scab. LaChipper and Cobbler were found to be quite similar in susceptibility to common scab, while Bounty was found to be very susceptible to russet scab. Early maturing red varieties like Norland were again found to be the most susceptible to silver scurf. Late blight was not a serious disease problem in 1964.

Internal discoloration has been found to be a serious problem for the selection ND 4524-7R. Being that this physiological disease seemed to be prevalent only in the progeny resulting from the pedigree ND 4524, internal examinations were conducted on the selections ND 4524-4R, ND 4524-7R and ND 4524-16R. From each of the four replications grown at Grand Forks and Park River, a fifty-tuber sample was cut and examined for internal discoloration.

The following results were found:

	<u>Park River</u> <u>% internal</u> <u>discoloration</u>	<u>Grand Forks</u> <u>% internal</u> <u>discoloration</u>
ND 4524-4R	0.01	0.00
ND 4524-7R	11.10	9.90
ND 4524-16R	6.10	16.30

Although both ND 4524-7R and ND 4524-16R were found to be highly susceptible in this test, it was encouraging that ND 4524-4R remained quite free of any internal discoloration.

North Central Regional Trial. Fifteen selections and check varieties were grown in the North Central Regional Potato trial at Grand Forks. Entries were obtained from Nebraska, Iowa, Wisconsin, North Dakota, Louisiana and the USDA. Outstanding entries for 1964 were ND 4192-3, I 57410, TL 7627, B 4523-8 and La 12-4. For overall adaptability it appears that ND 4192-3, La 12-4 and I 57410 have the most promise as commercial varieties.

Commercial Seed Production of New Varieties and Selections. Apparently ND 4524-4R should have been increased in favor of ND 4524-7R. However, the genetic weakness found in ND 4524-7R for internal discoloration was not considered to be a serious problem until it was grown during the warm season of 1964. The high temperatures during late July were believed to be responsible for this physiological disease to appear. At the present it seems advisable to discard ND 4524-7R and attempt to increase ND 4524-4R. Both of these selections have similar horticulture characteristics. Two hundred and thirty acres of ND 4524-7R and less than one acre of ND 4524-4R were submitted for certification by North Dakota growers.

The advanced selection, ND 4192-3, was released and named Norgold Russet in 1964. This new russet variety has been found to be highly adapted to conditions in the Red River Valley and several other major producing areas. It appears that Norgold Russet will have a great potential in North Dakota, both as a seed and table stock variety. Over 2200 acres passed eligibility for certification in 1964. Next season it is expected an increased volume will be available as certified seed and special table packs.

In 1964, 191 acres of ND 3631-6R, 161 acres of Viking and 136 acres of Snowflake were grown for certified seed in North Dakota. Several new selections from North Dakota, Louisiana and other states were also increased by North Dakota certified seed growers.

Chipping Trials. Ninety-six advanced selections were tested for chipping quality on February 3rd and March 3rd, 1964 (North Dakota table 4). Samples were chipped out of cold storage at 40° F. and after one month of reconditioning at 70° F., a 100 gram sample was fried in peanut oil at 350° F. Color and weight loss determinations were made immediately after frying. ND 6428-1, ND 5886-2, ND 5899-1, ND 5922-12 and ND 5470-13 produced chips of medium quality when chipped out of cold storage. After reconditioning, several selections produced chips with quality comparable or better than Kennebec. ND 5899-1 produced exceptionally good chip quality.

At Grand Forks, 66 promising North Dakota selections and 5 selections from Louisiana State University were harvested and saved for processing studies. All of these selections will be tested for chipping, frozen french frying and dehydration by the new USDA Processing Laboratory at East Grand Forks.

North Dakota table 1. Characteristics of promising North Dakota selections.

Selection	Parentage	Gen. tuber rating ^{1/}	Maturity	Other Characteristics
ND6095-6	Antigo x 4957-4	4-	Early	Type
ND6095-7	" "	4+	"	Chips
ND6109-1	Golden Chip x Snowflake	3	Late	"
ND6125-4R	Norland x 3849-6	3+	"	Type
ND6127-10R	Red LaSoda x 4972-1R	3+	Early	Color
ND6207-5R	B4212-1 x 4524-16R	3+	Late	"
ND6209-2	F5205 x Snowflake	3+	Early	Good chipper
ND6256-2	Russet Burbank x 4957-4	3+	Late	Russet
ND6266-3	W 59 x 4957-4	3	Early	Chips
ND6286-1	Snowflake x B3692-4	4	"	"
ND6299-4	3694-6 x 4957-4	3	"	"
ND6306-2R	Viking x Neb 38.49-6	4	Late	Type
-3R	" "	3+	"	Color
-4R	" "	3+	Very late	"
ND6327-7	4558-1 x B3696-13	3+	Late	Russet, chips
ND6333-7R	4580-9R x 4524-7R	4	"	Color
ND6345-3	4650-2R x TL 1859	3+	"	Chips
ND6381-3R	4814-7R x Neb 28.49-6	4	"	Color
ND6428-1	4993-3 x B3892-4	4	Early	Chips
ND6441-3	5036-2 x B3696-13	3+	Late	Long
ND6448-1R	5058-3R x 4524-7R	4	Early	Color
ND6454-1R	5082-13R x Neb 38.59-6	4	Late	Color, type
ND6500-2	5202-3 x Norgold Russet	3+	Early	Russet
-6	" "	4	Late	Russet
ND6509-7R	5219-6R x 4524-7R	4+	Early	Color
ND5363-9	B4130-11 x Wisc AG 120	4	Late	Type
ND5751-7	Cobbler x Snowflake	4	Early	Chips
ND5778-2R	Redkote x 4468-1R	4+	Late	Yield, color
ND5782-1R	Red LaSoda x 4524-7R	4	"	Type
ND5862-2R	I 1213-1 x 4811-6R	4	"	Heavy set
ND5886-2	LaChipper x Snowflake	4	Early	Chips
ND5896-13R	TL 1859 x 4916-6R	4	"	Color
ND5899-1	M 5009-2 x 4631-1	4	"	Excel. chipper
ND5922-12	W 56 x Snowflake	3+	Late	Type
ND5943-3R	3962-8R x 4468-1R	3+	Early	Color
ND6017-5	4631-1 x B3114-67	3	"	Chips
ND6051-2	4688-1 x M5227-5	3	"	Chips, very susc. internal dis.
ND5281-22	Russet Burbank x Snowflake	3+	"	Russet
ND5402-7	M5009-2 x Snowflake	3+	"	Chips
ND5475-6	3562-5 x 3740-11	3	Late	Excel. chipper, Russ.
ND5475-7	" "	3	Early	" " Russ.
ND5488-11	3676-20 x Norgold Russet	3+	"	Chips, high Sp. Gr. Russ.
ND5502-15	3740-11 x " "	4	Late	Russet
ND5507-19	3919-2 x 457-1	3+	Early	"
ND4957-4	Katahdin x Snowflake	4	"	Chips
ND4524-4R	TL 1859 x 3842-3R	3+	Late	Color and type

^{1/} General tuber rating: 1--poor type, 5--excellent type.

North Dakota table 2. Marketable yield and percent U. S. No. 1 of varieties and selections grown in State-wide potato variety trials, 1964.

Variety	Grand Forks		Park River		Minot		Carrington		Williston	
	Cwt.	Pct.	Cwt.	Pct.	Cwt.	Pct.	Dryland Cwt.	Irrigation Cwt.	Dryland Cwt.	Average Cwt.
Red Pontiac	210	97	252	95	134	96	105	82	138	87
Red LaSoda	197	98	183	91	117	94	115	83	128	86
Kennebec	185	95	200	99	121	95	134	85	112	82
LaRouge	184	94	201	93	115	90	110	86	120	83
Viking	189	99	181	91	91	95	131	89	100	91
Cobbler	185	91	189	88	103	86	82	77	102	71
Bounty	174	95	177	88	127	93	89	76	120	86
Norgold Russet	160	89	177	87	105	88	120	78	92	71
ND 4524-7R	190	95	186	94	81	93	91	78	86	81
ND 4524-4R	157	95	194	95	79	91	112	81	72	78
Norland	111	82	163	90	111	92	124	86	92	73
Early Gem	91	57	131	80	99	90	105	75	67	80
Russet Burbank	109	72	137	77	97	84	102	78	59	57
LaChipper	98	91	104	86	66	89	80	81	81	78
Snowflake	119	86	107	83	71	90	100	76	49	71
ND 4524-16R	161	92	155	83			92	75		
Superior	162	97	149	93						
Average	158		170		101		106		94	
LSD 1%	57		76		50		NS		40	
5%	43		57		38		NS		29	

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North Dakota table 3. Percent total solids of varieties and selections grown in State-wide potato variety trials, 1964.

Variety	Grand Forks Pct.	Park River Pct.	Minot Pct.	Carrington		Williston		Average Pct.
				Dryland Pct.	Irrigation Pct.	Dryland Pct.	Irrigation Pct.	
Cobbler	22.9	20.9	20.7	20.3	19.9	22.4	21.6	21.2
Russet Burbank	21.8	20.9	19.2	19.2	18.8	22.9	20.7	20.5
Kennebec	20.9	20.1	19.0	20.3	17.5	22.9	19.9	20.1
Norgold Russet	21.4	20.1	18.4	19.2	18.2	21.4	20.1	19.9
Snowflake	20.1	20.3	19.4	19.2	17.7	21.6	20.5	19.9
Bounty	21.4	20.1	18.4	18.0	19.0	22.0	19.2	19.7
Viking	20.9	19.4	18.2	18.2	18.8	22.0	19.4	19.7
LaRouge	20.5	20.1	18.9	18.8	18.2	21.4	20.1	19.4
ND 4524-4R	21.4	19.9	18.2	18.5	18.0	21.4	19.4	19.4
LaChipper	21.6	19.2	18.6	18.8	18.5	19.2	19.2	19.2
Red LaSoda	20.5	19.7	18.2	18.8	17.3	21.6	19.0	19.2
ND 4524-7R	20.3	19.7	17.3	17.7	16.5	20.3	18.6	18.6
Norland	18.6	18.4	18.0	17.3	16.2	19.7	20.5	18.4
Red Pontiac	19.2	18.0	17.3	17.1	17.5	19.9	18.2	18.2
Early Gem	19.7	19.0	17.1	16.2	16.0	19.7	19.2	18.2
ND 4524-16R	21.4	21.2						20.1
Superior	22.0	21.4		19.0	19.0			21.8
Average	20.9	19.9	18.4	18.6	18.0	21.2	19.7	19.6

North Dakota table 4. Chipping quality tests, 1964.

Selection	Chipped immediately out of cold storage at 40° F.		Chipped after reconditioning for four weeks at 70° F.	
	Color <u>1/</u>	Yield <u>2/</u>	Color	Yield
ND 6095-6	9	27.3	4	34.4
ND 6108-1	10	31.8	9	30.9
ND 6109-1	10	31.2	5	31.5
ND 6116-1 <u>3/</u>	9	29.5	9	32.5
ND 6116-6 <u>3/</u>	10	34.0	9	31.1
ND 6125-2	10	34.0	8	34.0
ND 6143-2	7	33.5	6	32.5
ND 6166-3	9	33.4	7	33.2
ND 6175-1	10	33.4	7	33.1
ND 6185-1	10	33.3	9	30.5
ND 6195-1	10	33.2	9	30.9
ND 6204-1	8	30.9	7	32.6
ND 6209-2	8	32.8	4	31.2
ND 6230-2	10	34.1	10	32.4
ND 6256-2 <u>3/</u>	10	33.0	9	30.7
ND 6266-2	10	33.0	9	32.2
ND 6266-3	10	31.0	3	31.1
ND 6268-1	10	31.6	10	33.6
ND 6271-1	9	34.5	9	32.7
ND 6286-1	7	34.2	4	31.5
ND 6294-4	7	34.5	4	33.7
ND 6326-1	10	29.2	10	30.0
ND 6443-2	9	34.9	9	35.0
ND 6451-1	10	33.1	9	32.2
ND 6466-2	9	31.1	9	29.8
ND 6475-4	10	31.1	10	31.2
ND 6493-6	10	30.0	9	28.5
ND 6495-1	9	30.6	8	31.5
ND 6495-4	9	32.0	9	33.3
ND 6499-4	10	30.2		30.9
ND 6500-1 <u>3/</u>	10	34.4	10	29.5
ND 6500-2 <u>3/</u>	10	30.6	10	34.0
ND 6500-6 <u>3/</u>	10	31.1	10	31.5
ND 6327-2 <u>3/</u>	8	31.6	9	31.6
ND 6327-3 <u>3/</u>	10	31.8	9	32.5
ND 6327-4 <u>3/</u>	10	32.0	9	32.4
ND 6327-7 <u>3/</u>	8	34.3	3	32.4
ND 6345-3	9	34.4	4	35.6
ND 6350-2	9	34.0	5	30.0
ND 6365-2	8	29.5	6	32.0
ND 6367-4	9	30.4	7	29.6
ND 6386-1	10	33.4	10	33.5
ND 6428-1	6	32.4	6	31.2
ND 6440-1	9	30.5	7	32.5
ND 5297-1	9	33.7	7	32.6
ND 5297-6	9	31.8	9	29.5
ND 5363-9	9	30.5	8	30.0
ND 5554-8	10	29.8	9	31.0

continued

North Dakota table 4, continued.

ND 5654-1	9	35.0	8	31.4
ND 5741-2	9	33.0	6	34.0
ND 5751-7	8	32.8	7	33.6
ND 5768-6	8	34.3	6.5	32.4
ND 5768-10	7	34.9	4	35.1
ND 5886-2	6	34.8	5	32.0
ND 5899-1	5	35.0	2	34.5
ND 5903-4	9	32.5	10	30.0
ND 5903-12	8	33.8	4	32.6
ND 5922-2	10	30.3	8	32.4
ND 5922-12	6	34.5	4	31.9
ND 6017-5	9	32.1	6	34.0
ND 6051-2	9	31.9	5	35.0
ND 5248-2 <u>3/</u>	9	31.1	9	34.7
ND 5281-5 <u>3/</u>	10	27.6	9	35.0
ND 5281-9 <u>3/</u>	10	29.5	10	31.0
ND 5281-22 <u>3/</u>	9	28.0	9	32.6
ND 5181-26 <u>3/</u>	8	31.6	8	32.1
ND 5191-5 <u>3/</u>	8	32.1	8	32.7
ND 5291-22	8	28.6	10	29.6
ND 5402-7	9	32.0	5	32.0
ND 5430-13	10	29.5	9	32.9
ND 5470-13	7	34.8	5.5	34.0
ND 5475-6 <u>3/</u>	8	32.2	2	34.0
ND 5475-7 <u>3/</u>	8	34.6	1	34.6
ND 5488-3 <u>3/</u>	10	29.5	10	33.3
ND 5488-11 <u>3/</u>	8	35.0	3	35.9
ND 5488-15 <u>3/</u>	10	31.9	9	34.1
ND 5488-26 <u>3/</u>	10	33.8	9	32.9
ND 5502-15 <u>3/</u>	10	30.1	9	29.0
ND 5507-8 <u>3/</u>	9	33.6	6	33.2
ND 5507-19 <u>3/</u>	10	32.6	9	32.0
ND 5508-2 <u>3/</u>	9	31.5	10	32.3
ND 5570-7 <u>3/</u>	10	27.6	9	32.8
ND 5636-11	9	33.1	9	32.0
ND 5952-2	9	32.4	8	33.0
ND 4957-4	9	29.0	4	33.2
ND 5192-2	10	31.6	10	29.0
ND 4643-4	10	29.2	10	28.0
ND 4954-4	10	32.8	10	30.0
ND 3022-18	10	31.6	8	34.5
Snowflake	10	31.6	7	30.5
ND 4122-25	10	27.6	8	29.6
ND 4122-2	10	31.4	8	33.4
ND 4192-3 <u>3/</u>	10	31.2	9	35.5
Irish Cobbler	7	31.6	6	32.0
Kennebec	7	27.4	2	34.6

1/ Chips with higher index numbers are darker in color (1=light, 10=dark).

2/ Percent chip yield.

3/ Russet type.

OHIO
J. P. Sleesman

The experimental insect resistant plots were planted in Ohio on May 8, 9, and 10. Precipitation during the months of May, June, July, and August was adequate but only 3.30 inches total rainfall fell in September, October, and November. Potato leafhopper and potato flea beetle populations were normal but foliage diseases were almost entirely absent.

Eighty-four advanced selections were grown in 10-hill plots for insect resistance studies. Twenty-nine of these selections were provided by Mr. Akeley and Dr. Schark, and they represented some of the best performers in the Maine tests. Data on leafhopper populations, amount of adult flea beetle feeding, tuber quality, and yield are summarized in Ohio table 1. Seedlings B4987-34, B5052-7, B4771-6, B5161-15, B5001-3, B5023-17, BO 5516-3, and BO 3848-5 were highly resistant to the potato leafhopper. In general, leafhopper populations increased as the season advanced but in most instances the resistant seedlings were lightly populated throughout the growing season and they showed a low degree of hopperburn injury at all times.

None of the seedlings was outstandingly resistant to the potato flea beetle. Seedlings B5019-7, B5030-10, B4744-25, B4987-30, and B5032-3 showed the least amount of feeding by the adult flea beetle.

Seedlings that gave the highest yield also were the most resistant to the potato leafhopper, which is expected since this insect is the largest single factor contributing to reduced yields of potatoes in Ohio. Highest yielding seedlings were B5052-17, B5161-15, B5001-3, B5023-17, B5058-1, BO 5516-3, ~~BO 5516-5~~, and BO 3848-5, B5052-7, B4987-34, B4986-1, and B5058-1, produced good looking tubers, whereas those of the other seedlings exhibited knobs or growth cracks or deep eyes or rough skin or flat shape or a combination of these undesirable traits.

Ohio table 1. Potato, leafhopper nymphal populations, degree of hopperburn injury, amount of adult flea beetle feeding, and yield of selected seedlings. Wooster, Ohio, 1964.

Pedigree Number	Flea Beetle holes/leaflet 7/8	Leafhopper Nymphs/leaf		Hopperburn Class 1/ 7/28 9/2		Yield Per Acre Cwt.
		7/28	9/2	7/28	9/2	
B4808-3	15.0	1.6	8.0	2.0	5.0	450
B4987-34	13.3	1.8	3.5	1.5	2.5	555
B5019-7	6.1	2.4	7.5	3.0	4.0	465
B5030-10	6.3	1.8	6.5	2.0	3.0	480
B5052-7	11.6	1.2	3.5	1.5	3.0	603
B4771-6	10.2	1.8	6.5	1.5	2.0	570
B4835-7	20.7	2.6	5.0	3.0	5.0	345
B4986-1	13.5	2.0	5.0	3.0	3.0	495
B4987-14	11.2	2.4	7.5	4.0	4.0	480
B5006-8	22.8	2.6	3.5	3.0	3.0	495

continued

Ohio table 1, continued.

B5161-15	21.1	.6	1.5	1.0	2.0	630
B4744-25	9.8	2.4	5.0	4.0	4.0	450
B4987-30	7.2	.8	5.0	2.0	4.0	435
B5001-3	13.9	1.8	.5	2.0	1.0	855
B5003-4	23.0	.8	5.0	3.0	4.0	447
B5010-8	19.5	2.6	6.0	4.0	4.0	240
B5011-31	16.1	2.0	2.5	2.0	2.5	432
B5023-17	12.9	1.8	5.5	1.0	4.0	690
B5032-3	8.0	2.2	4.0	2.0	2.0	532
B5058-1	39.9	.2	2.5	1.0	4.0	622
B5068-4	15.3	.8	5.0	3.0	5.0	405
BO 5515	12.6	2.2	14.0	1.7	4.5	420
BO 5516-2	19.3	1.0	2.5	1.2	1.5	525
BO 5516-3	19.7	1.8	2.5	1.8	2.0	705
BO 5516-4	19.7	2.3	3.5	2.7	3.0	390
BO 5516-5	14.5	2.7	7.5	2.0	4.0	645
BO 5516-6	12.0	1.4	8.0	1.7	4.0	540
BO 5526	17.8	2.6	6.5	2.3	4.0	630
BO 3848-5	26.6	1.1	1.5	1.8	1.7	765
Irish Cobbler	16.2	2.6	8.0	4.0	5.0	342

1/ Classes of hopperburn: 1, None; 2, Trace; 3, Light; 4, Medium; 5, Heavy.

OHIO
Floyd Lower

Probably the most promising new varieties in the trials in 1964 were LaChipper, Snowflake, Superior, and possibly Norgold (ND4192-3) of the early varieties; the seedling WY1122 of the mid-season varieties; and Ona of the late varieties. Fundy of the early varieties and Pungo of the medium varieties were the least satisfactory. WY1122 did not look as good as last year. Otherwise the results for each of the varieties were similar to that of last year.

All of the early and the medium early varieties yielded above Cobbler except Fundy. LaChipper, Norgold, Snowflake, Early Chippewa, and Plymouth outyielded Katahdin planted with the early varieties by a considerable amount. Avon and Arenac yielded about the same as Katahdin. Superior, Cobbler and Fundy yielded below Katahdin.

Katahdin was also planted with the mid-season and late varieties. Kennebec, Teton, Sebago, and Ona outyielded Katahdin in this group. Russet Sebago was about the same. Pennchip and WY1122 yielded less than Katahdin.

In the yields of marketable potatoes Superior yielded with Katahdin in the early and medium-early lots, and Pennchip yielded with Katahdin in the mid-season and late lots; otherwise the yields of marketable potatoes holds the same relationships as the total yields.

Pungo was planted on the Becker, Thompson, and Chadwick farms, but the stands were poor and neither the actual yields nor the adjusted yields were representative of this variety. Consequently, these figures are not included in the tables. This variety has not proven satisfactory in Ohio. Of the replicated varieties grown this year, Fundy and Pungo will definitely be dropped. Only the most promising of the observation varieties will be continued. None of these have shown enough promise to plant in the replicated plots.

The average percentage of marketable potatoes was 88.3, slightly higher than last year. The varieties grading an average of more than 90% marketable were Superior, 94.4; Russet Sebago, 92.6; Snowflake, 91.6; Fundy, 91.5; Sebago, 91.2; LaChipper, 91.1; and Avon, 90.6. All others averaged from 79.9 to 89.7. Kennebec graded the lowest with 79.9 and Pennchip the next with 81.7. Both varieties showed much greening and many off shaped tubers.

Other than stalk rot on two farms little disease was found except fusarium and verticillium wilt. Fundy was the most severely infected with wilt. Other varieties in which the plants showed symptoms of a considerable amount of wilt in order were: Norgold, Snowflake, Superior, and Cobbler. All other varieties showed lesser amounts. Stem and discoloration was very severe in Pungo, Cobbler, Fundy, and Snowflake among the early varieties, and Teton, Sebago, Russet Sebago, and Ona among the mid-season and late varieties.

Norgold, Superior, and Fundy are of about the same maturity as Cobbler. LaChipper and Snowflake are a few days later. Ona is later than Sebago.

Growth cracks were observed in the culls graded out of the following varieties on one farm for each: Snowflake, Pungo, Plymouth, Arenac, Teton, Kennebec, Katahdin, and Ona.

Cracks were found in WY1122 on two farms, and in Pennchip on three farms.

In size Pennchip tended to be small. Kennebec, Pungo, Russet Sebago, E. Chippewa, Katahdin, Sebago and LaChipper tended to be large.

Grade defects were mostly greening and misshapen tubers. Growth cracks were next in importance.

Some conclusions can be drawn from the 1963 and 1964 variety work. Fundy and Pungo can hardly be recommended for use in Ohio. Norgold is worthy of trial for an early table stock potato. North Dakota, where it originated, reports that it will not chip satisfactorily. For early varieties to replace Cobbler, trials of Superior, LaChipper and Snowflake are recommended. Response may vary under different soil and weather conditions.

For the medium early varieties, Chippewa is known to all Ohio growers. Avon, Arenac, and Plymouth need further tests before definite conclusions can be drawn, but it is doubtful as to whether they are any better than early planted Katahdin for this maturity season.

Kennebec and Katahdin are still the best of the mid-season varieties. Teton has compared favorably with them. WY1122 needs further testing. Pennchip appears to be disappointing but needs to be checked further. Pennsylvania reports that it chips well.

Ona still looks promising as a late variety but needs further testing. Sebago and Russet Sebago are equally good late varieties.

Of the white observation varieties planted in single row unreplicated plots on 3 farms, and from which to select the varieties for further trial next year, a number are worthy of more testing. On the basis of yields LaSalle, LA 61-125, Iowa 961, Haig, Nebr. 4-56-9, Ia. 57324-10 and F4724 were among the most promising of the early varieties. Of the medium early and midseason varieties, Hunter, Penobscot, Reliance, Shoshoni, Blanca, and several seedlings offered the most promise.

Red varieties generally out yielded the white varieties. Red Pontiac, Red LaSoda and LA 62-162 lead the list. Red Beauty was the poorest of the red varieties.

Twelve early and medium early and eight mid-season and late varieties were planted on 6 farms. Only the early varieties were planted on the Becker farm and only the late varieties on the Tritten farm. Both groups were planted on the other farms. Cooperating growers were Harold Thompson in Columbiana County, Glenn Chadwick in Portage County, Donald Becker in Tuscarawas County, Ivan Moomaw in Wayne County, Henry Stucke in Mercer County and Tritten Brothers in Columbiana County. In each replicate each variety was planted in double rows of 50 hills each.

The observation varieties were planted in single rows of 50 hills each on the Thompson, Chadwick and Tritten farms. Thirty-six white varieties and 11 red varieties were planted. The Red varieties were planted along side the white varieties to facilitate digging operations.

Other than wilt and stalk rot, little disease was present. Of the virus diseases a trace of mosaic was found in Pungo, WY1122, Pennchip and Fundy on one or more farms. A trace of leafroll was found in Pungo and Pennchip on one or more farms. Bacterial

stalk rot was severe at the Becker farm and some infection occurred at the Chadwick farm. At the Becker farm, all varieties but Early Chippewa had from two to 19 infected plants in the plots. Cobbler had the most stalk rot with Norgold, Fundy, Snowflake and Plymouth following in order and others with a lesser amount. Norgold and Cobbler had several plants infected with stalk rot at the Chadwick farm.

In the observation plots 3 of the seedlings showed considerable infection of mosaic on one or more farms and 2 of the seedlings showed considerable leafroll. A few others showed traces of virus disease. At least ten of these varieties showed the plant symptoms of wilt in a considerable quantity and 12 of them showed severe stem end discoloration of over 20% of the tubers checked.

On August 17, after 6 weeks without rain at the Stucke Farm, Norgold and Fundy were dying, showing inability to withstand drought. When harvested and graded the effect was apparent in the small size of tubers of Norgold and Teton, and in the yields of Norgold, and Pennchip. Norgold also graded out very poorly.

Apparently Norgold, Fundy, Pennchip and probably Teton lack drought resistance. Superior, which is known to be susceptible to drought injury, responded satisfactorily in this case.

Lower table 1. Total yields, percent marketable and yields of marketable potatoes, average of all farms, Ohio 1964. (Listed by maturity season in order of ave.yield)

Variety	Total Average Yield Per Acre	Marketable Pct.	Average Yield of Marketable Potatoes Per Acre
	Cwt.		Cwt.
EARLY:			
LaChipper	343	91	316
Snowflake	299	92	276
ND 4192-3	303	84	263
Superior	276	94	261
Cobbler	269	90	244
Fundy	262	92	241
Average			267
MEDIUM EARLY:			
E. Chippewa	345	88	304
Plymouth	300	87	265
Avon	290	91	265
Katahdin	289	89	261
Arenac	290	88	257
Average			271
MID- SEASON:			
Teton	300	89	272
Kennebec	318	80	251
Katahdin	260	84	218
Pennchip	254	82	217
WY 1122	243	86	210
Average			234
LATE:			
Sebago	291	91	268
Ona	280	88	247
R. Sebago	263	93	246
Average			253
AVERAGES:			
Early		90	269
Mid-Season and Late		86	241
All lots	284	88	253

PENNSYLVANIA
J. D. Harrington and F. J. McArdle

Experiment and Location of Experimental Site: 1964 Variety Performance Trial; Department of Agronomy Research Farm near Centre Hall (Centre County), Pennsylvania.

Soil Type and Characteristics: Hagerstown silt loam; heavy, medium deep, well-drained, high fertility, O.M.-2.5%, pH-6.2.

Date, Method of Planting, Spacing and Fertilization: May 4; before planting; single-row planter banded 3000 #/A 5-10-10 fertilizer in 36-inch spaced rows; seed pieces hand-planted 9-inches apart within row.

Plot Size, Design and Number of Replications: 30-foot single-row plots with 3-foot break between plots; completely randomized block design with 5 replications.

Date of Harvest: October 5; 154 days after planting.

Date and Methods for Determination of Chip Indices: October 23; employed potato hydrometer for specific gravity determinations; readings converted to total solids with table prepared by Behrend, Maercker and Morgen; chip yield determined on duplicate one-half pound samples of peeled potatoes; Rd color values measured against Gardner color standard #C-LY-1047-57; color values above 20.0 considered marketable.

Weather Conditions: Below normal rainfall, low night temperatures; first killing frost recorded September 14; summary shown in tabular form below:

Period	X Air Temp., of		Total Rainfall, Inches
	Max.	Min.	
5/4 - 9/3	78	53	7.87
9/14 - 10/4	68	44	1.64

Results: Pennsylvania table 1.

Pennsylvania table 1. Tuber yield and chip indices after fall harvest in Centre County, 1964.

Variety or Seedling	Seed Source	U.S. No. 1		1/ Specific Gravity	Chip Indices		2/ Color Rd
		Yield Per Acre			Yield Lbs.Per 100 Lbs.		
		Cwt.	Pct.				
Early to Medium-Early Maturity							
Pungo	Me.	158	91	94	32.8		23.3
LaChipper	Wis.	154	89	90	30.2		30.6
Superior	USDA	145	91	88	32.4		29.1
F4613	USDA	133	93	74	28.0		27.7
X1276-185	USDA	131	83	77	29.3		26.2
Cobbler	Me.	129	83	86	30.2		27.1
Reliance	Minn.	128	88	83	31.1		24.6
Catoosa	USDA	126	90	89	32.6		25.9
Cobb., Pre-Cut	Me.	125	82				
Snowflake	USDA	118	86	86	31.1		27.8
Avon	USDA	110	88	84	30.0		30.0
Norland	Me.	96	83	64	25.6		19.4
LSD	(.05)	21					

continued

Pennsylvania table 1, continued

Midseason Maturity

Alleghanna	USDA	184	96	84	29.5	22.2
WY 1122	USDA	183	91	90	30.6	31.3
Chippewa	USDA	164	89	80	29.3	30.2
Hunter	USDA	163	88	98	33.0	26.8
Arenac	USDA	153	92	103	34.8	34.2
B 73-3	USDA	146	92	91	32.8	28.6
Plymouth	USDA	139	90	84	30.4	25.7
LSD	(.05)	25				

Medium-Late to Late Maturity

Kennebec	Pa.	258	95	88	30.6	31.7
Redskin	USDA	244	97	89	30.6	25.7
Saco	USDA	221	90	91	30.6	17.0
Green Mountain	USDA	205	88	94	35.2	27.1
Mohawk	USDA	198	97	99	33.0	28.9
Delus	USDA	197	97	105	35.7	30.9
Red Pontiac	Me.	197	93	80	28.6	25.8
Kat., Pre-cut	Me.	196	94			
Katahdin	Pa.	195	92	89	30.8	31.3
Penobscot	USDA	186	92	100	34.4	27.2
Russet Rural	Pa.	183	81	84	30.2	26.8
Pennchip	Pa.	177	88	88	30.4	29.7
Emmet	USDA	175	89	93	35.2	28.5
Sebago	Ca.	172	91	82	29.5	28.2
Smooth Rural	USDA	165	84	85	31.9	29.7
Ontario	USDA	157	70	86	31.5	26.4
Ona	USDA	142	83	82	29.5	29.4
Russet Burbank	USDA	127	68	92	31.7	24.8
LSD	(.05)	40				

1/ 1.0 omitted from all specific gravity ratings.

2/ Rd values of 20.0 and above are considered marketable.

PENNSYLVANIA
E. C. Pifer

In 1964 extension variety demonstrations were conducted in the following counties and regions: Erie County, northwestern region; Lehigh County, eastern region; Potter County, north central region; Schuylkill County, east central region; Somerset County, southwestern region; and York County, southeastern region. Twelve varieties were evaluated for yield and chipping quality.

Chipping determination for all trials were performed by personnel in the Horticultural Processing Laboratory, Department of Horticulture.

County	<u>Cultural Information and Rainfall</u>			Total Rainfall for Period - Inches
	<u>Planting Date</u>	<u>Harvest Date</u>	<u>Length of Season-Days</u>	
Erie	5/13	9/29	139	22.1
Lehigh	5/11	9/23	135	8.7
Potter	5/15	10/1	139	7.3
Schuylkill	5/5	9/24	142	9.3
Somerset	5/12	9/22	133	13.8
York	5/6	10/6	153	8.7

All demonstrations were designed as randomized blocks with four replications. Specific fertilizer applications at each location were made on the basis of soil test results. Recommendations were made to achieve a yield of 300 cwt. per acre. The fertilizer recommendations were: Erie County, 750 lbs. 10-20-20 per acre; Lehigh County, 1200 lbs. 10-20-10 per acre; Potter County, 1500 lbs. 10-20-20 per acre; Schuylkill County, 1500 lbs. 10-20-20 per acre; Somerset County, 1200 lbs. 10-20-20 per acre; and York County, 2000 lbs. 10-10-10 per acre. Seed pieces of each variety were hand-planted in 30-foot row plots, 9 inches apart, within the row and with a distance of 34 inches between the rows at five locations, and 32 inches between rows at one location. Seed pieces of Red Pontiac were planted in the 5 foot breaks between plots to avoid varietal mixing at digging. Total yields were recorded at harvest and tubers were graded immediately. Composite varietal samples from the four replications combined were taken at each location and saved for specific gravity and chipping determinations.

Quality and Chipping Determinations

Specific gravity was determined with the use of a potato hydrometer. Chip yields were determined on the basis of peeled potatoes to eliminate variations resulting from the peeling process. Gardner Rd color values were determined against Gardner color standard #C-LY-1047-57. Chips with Rd values of 20.0 and above were considered marketable.

Experimental Results

Data for the six outlying county trials in Pennsylvania are shown in Pifer table 1.

Pifer table 1. Tuber yield and chipping determinations after harvest for 12 potato varieties produced in six counties in Pennsylvania, 1964.

Variety	U.S. No. 1		Specific Gravity	Chip Indices	Color Rd
	Yields	Per Acre		Yield - Lbs. Per 100 lbs.	
	Cwt.	Pct.			
<u>Erie County</u>					
Kennebec	439	96	1.073	28.0	24.7
Emmet	393	97	74	28.9	22.5
Sebago	386	96	68	28.4	28.8
Ona	385	93	69	27.8	24.9
Russet Rural	351	93	73	29.3	28.6
Katahdin	349	97	64	28.2	23.7
Irish Cobbler	329	94	73	29.3	26.2
Reliance	328	96	65	24.9	24.5
LaChipper	295	93	64	25.1	23.9
Norland	261	94	56	25.3	25.2
Pennchip	241	94	63	26.7	29.0
Superior	207	93	68	26.9	28.1
MEAN	330	95	68	27.4	25.8
<u>Lehigh County</u>					
Reliance	167	90	1.076	28.9	29.1
Katahdin	163	91	77	29.5	34.0
LaChipper	146	90	80	28.4	32.9
Superior	142	94	83	30.2	28.0
Kennebec	135	90	77	28.0	33.3
Sebago	135	89	73	29.7	29.8
Norland	128	89	63	26.2	29.9
Irish Cobbler	127	88	82	30.4	30.2
Emmet	123	88	85	31.5	31.7
Ona	120	81	77	32.8	34.0
Russet Rural	89	78	79	31.5	27.6
Pennchip	76	84	83	29.1	30.0
MEAN	129	88	78	29.7	30.9
<u>Potter County</u>					
Kennebec	329	91	1.084	29.5	26.5
Ona	299	95	82	30.6	27.3
Katahdin	297	93	81	30.0	25.5
LaChipper	297	92	80	29.5	26.7
Superior	282	98	78	29.3	22.8
Emmet	280	92	87	30.6	25.7
Irish Cobbler	263	92	88	31.1	25.5
Russet Rural	261	93	88	32.6	23.7
Sebago	241	92	79	30.2	28.5
Norland	203	95	65	27.1	30.8
Reliance	193	91	73	27.3	25.3
Pennchip	134	81	67	30.2	24.2
MEAN	257	92	795	29.8	26.0

continued

Pifer table 1, continued

Schuylkill County

Kennebec	193	81	1.080	30.8	28.1
Katahdin	185	84	80	32.2	28.8
Emmet	170	81	89	32.8	29.0
LaChipper	152	75	84	31.9	31.4
Norland	130	84	69	30.0	26.6
Reliance	124	77	77	28.4	25.8
Sebago	122	71	84	31.5	25.9
Irish Cobbler	110	67	80	31.1	28.8
Ona	109	68	85	30.8	32.3
Superior	107	81	86	31.3	28.4
Russet Rural	94	61	87	32.8	29.9
Pennchip	76	73	89	33.0	25.9
MEAN	131	75	826	31.4	28.4

Somerset County

Ona	301	76	1.087	33.9	31.2
Irish Cobbler	300	88	76	29.5	27.1
Sebago	294	86	85	32.8	28.6
Superior	286	82	73	29.1	29.7
Emmet	284	76	87	32.6	30.6
Norland	278	92	68	30.0	25.9
Russet Rural	257	74	85	33.3	26.2
Katahdin	241	76	77	28.4	28.5
LaChipper	214	68	84	31.1	28.4
Kennebec	213	55	88	32.6	27.1
Reliance	211	60	66	28.0	23.6
Pennchip	115	48	70	29.5	26.8
MEAN	250	73	79	30.9	27.8

York County

Katahdin	309	94	1.079	31.1	27.3
LaChipper	295	94	78	27.3	27.4
Superior	292	94	76	28.0	29.8
Kennebec	277	86	80	28.4	27.7
Emmet	274	90	76	29.5	22.0
Sebago	265	95	81	27.8	31.2
Irish Cobbler	253	85	83	31.1	28.6
Reliance	253	85	82	29.7	27.5
Norland	251	94	66	26.9	23.1
Ona	244	90	82	30.8	22.1
Russet Rural	232	86	90	31.1	29.2
Pennchip	158	88	82	29.3	31.5
MEAN	259	90	80	29.3	27.3

continued

Pifer table 1, continued.

Average

Kennebec	265	83	1.080	29.5	27.9
Katahdin	257	90	76	29.9	28.0
Emmet	254	88	83	31.0	26.9
Ona	243	86	80	31.1	28.6
Sebago	241	90	78	30.1	28.8
LaChipper	233	85	78	28.9	28.5
Irish Cobbler	230	87	80	30.4	27.7
Superior	220	90	77	29.1	27.8
Russet Rural	214	83	83	31.8	27.5
Reliance	213	82	73	27.9	26.0
Norland	209	92	64	27.6	26.9
Pennchip	133	77	76	29.6	27.9
MEAN	226	86	78	29.7	27.7
LSD .05 locations	56		02		
varieties	34		01		

PENNSYLVANIA

W. R. Mills

The object of the breeding program continues to be the development of varieties, resistant to disease, which possess superior chipping quality. All hybridizing, seedling production and greenhouse testing is done at University Park. Seed is increased in Potter County, a northern, high altitude seed area. Yield and adaptation trials are conducted at the above two locations and in Lehigh County, an important table stock region in the southeastern part of the State.

Lehigh County was extremely dry. Only 8.5 inches of rainfall were recorded from May 15 to September 15, of which 5.7 came in June. Yields were very low. University Park was also very dry, but was supplemented with overhead irrigation. Rainfall was about normal in Potter County with a very good crop.

About 100 varieties were planted for performance tests in the three areas. Some selected yields, with specific gravity and chipping quality indices, are included in Pennsylvania table 1.

The figures representing color of chips are an average of 7 trials made at approximately two-week intervals, from October 7 to December 29, taken directly from 50° storage. Previous experience has demonstrated that if a variety will chip after storage at 50° F. that it will also chip when freshly harvested. The reverse is not necessarily true. Sample lots from these varieties will also be tested for reconditioning after storage at 38-40° F.

Almost without exception, the lightest colored chips resulted from the Lehigh County samples. Those from Potter were the darkest, with very few making satisfactory chips over the 14-week period. This is attributed to a freeze early in September, which completely killed the vines.

Most of the varieties from University Park were also acceptable in chip color, although they averaged one to two grades darker than Lehigh.

Pennsylvania table 1. Yields (over 2-1/4"), specific gravity and chipping quality at four locations in Pennsylvania, 1964.

	Yield Per Acre				Tubers Over 2-1/4"				Specific Gravity ^{1/}				Chip Color ^{2/}			
	Univ.		Univ.		Univ.		Univ.		Univ.		Univ.		Univ.		Univ.	
	Potter	Cwt.	Park	Lehigh	Potter	Cwt.	Park	Lehigh	Potter	Pct.	Park	Lehigh	Potter	Pct.	Park	Lehigh
6HS-7	460	520	129	129	95	95	95	85	79	71	76	4.0	1.3	1.1		
6FQ-3	431	433	80	80	93	92	92	58	71	73	74	4.9	2.9	1.7		
6IA-1	437	-	100	100	97	-	-	70	77	-	78	6.9	-	3.3		
5UG-8	421	489	120	120	96	98	98	86	75	73	75	5.6	2.6	1.8		
6MB-4	416	-	86	86	95	-	-	76	79	-	85	7.2	-	2.3		
6CY-18	388	518	82	82	91	93	93	63	88	79	81	2.1	1.8	1.2		
6CX-6	399	-	123	123	94	-	-	78	87	-	89	4.0	-	1.4		
6HO-10	400	499	104	104	96	96	96	80	83	76	84	7.3	3.6	2.0		
6MJ-3	385	385	37	37	96	95	95	60	82	81	-	5.6	3.1	-		
6KA-1	376	350	104	104	96	94	94	84	83	68	70	6.6	2.8	1.6		
Kennebec	364	340	123	123	93	95	95	85	78	82	80	5.7	2.8	1.0		
6JE-5	349	231	74	74	90	91	91	56	86	75	88	5.9	3.4	1.8		
6AO-4	357	351	103	103	93	95	95	81	73	62	-	5.6	2.9	-		
6IL-5	359	-	-	-	94	-	-	-	86	-	-	5.4	-	-		
6HM-3	359	288	86	86	97	95	95	74	80	87	98	4.1	1.2	1.2		
NY-1	339	385	104	104	95	91	91	72	84	76	80	4.3	2.1	1.6		
6NM-2	325	410	44	44	92	93	93	70	75	72	81	6.1	3.9	1.5		
Pennchip	311	327	104	104	89	92	92	76	68	74	81	2.3	2.1	1.5		
6IE-16	328	332	68	68	94	95	95	65	78	70	73	4.7	2.7	1.2		
5MB-3	334	-	119	119	96	-	-	80	80	-	-	5.9	-	-		
6IE-6	323	-	168	168	94	-	-	92	81	-	77	3.0	-	1.4		
6KV-2	298	-	103	103	87	-	-	72	84	-	80	6.0	-	1.8		
6HU-2	311	332	35	35	92	94	94	48	77	70	-	8.7	3.1	-		
Russet Rural	297	304	86	86	90	87	87	81	82	77	84	5.3	4.9	1.8		
6NK-2	308	454	98	98	94	95	95	74	74	68	-	6.4	3.2	-		
6OH-2	320	-	98	98	98	-	-	90	81	85	-	2.3	-	1.3		
Cobbler	304	280	94	94	94	91	91	72	83	74	81	6.6	4.3	2.1		
Katahdin	290	326	108	108	93	93	93	80	77	82	79	5.9	2.7	2.0		
B5141-6	265	-	151	151	89	-	-	82	07	-	05	3.0	-	1.4		

^{1/} 1.0 omitted from all specific gravity readings except 1.1 omitted from B5141.6

^{2/} Chip color key: 1-4 is desirable; 5 acceptable; 6 and above not acceptable

RHODE ISLAND
Robert S. Bell

Potato Variety Trials

Nine named varieties and nine numbered selections were included in the 1964 trials at the Rhode Island Agricultural Experiment Station. Most of the seed stock was obtained from the USDA at Presque Isle, Maine. The names or numbers as well as various results are shown in Rhode Island Table 1.

They were grown in silt loam soil. Low chloride 10-10-10-1.2 fertilizer at 1800 pounds per acre was banded at planting on April 17. The rows were 3 feet apart and the seed pieces were spaced 9 inches apart in the row. They were hilled June 24 and dug September 2. There were 4 replicates of each variety.

Rainfall was seriously deficient during 1964, with the exception of July. The varieties received one inch of irrigation water on July 2 and 1.57 inches of rain on July 3.

Manzate was applied at weekly intervals as a blight preventative starting on July 14. It was combined with thiodan for insect control. The insecticide, sevin, was used in late May and early June.

The Pennchip variety produced the largest and best looking plants in the test. B3309-8, B3725-1 and ND 4192-3 were dead by the end of July. All the named varieties looked well to mid-August with exception of Viking which died early.

The yields are listed in hundredweights per acre of US No. 1 tubers. The yields were analyzed statistically by Duncan's multiple range test. Green Mountains, Huron and Kennebecs were in the top yield group both in 1963 and 1964. A new variety, Pennchip, was also in this group in 1964. The yields of Green Mountains and Kennebecs were about 100 hundredweight less than in 1963. The yields of Katahdins, however, were almost identical for the two seasons being 285 and 290 for 1963 and 1964, respectively. The lowest yields were produced by the 3 numbered seedlings which died by August 1.

The highest specific gravity, 1.087, was produced by Penobscot which is a new variety resistant to leafroll virus and mild mosaic. It is a cross between Katahdin and seedling X927-3. The specific gravity runs considerably higher than that of Katahdin which was 1.073 for 1964. The Penobscot tubers are oblong to oval with cream-buff skin and eyes of medium depth. Other potato varieties with a fairly high specific gravity were Green Mountain (1.085), Huron (1.082), Catoosa (1.080), Russet Burbank (1.079) and Pennchip (1.078).

All varieties reconditioned well for chips after 3 weeks at 70° F. with the exception of ND 4192-3, B3309-8 and Huron.

Rhode Island table 1. Potato variety test, Kingston, Rhode Island, 1964.

Variety	U.S.No.1 Per Acre Cwt.	Duncan's ^{1/} Significance	Specific Gravity	Storage 40-50°F.	Chip Ratings ^{3/} from After 3 weeks at 70°F.	
Green Mountain	328	*	85	4		4
Pennchip	316	*	78	3		3
Kennebec	297	*	74	3		3
Katahdin	290	*	73	4		4
Russet Burbank	280	*	79	3		3
Huron	273	*	82	7		6
B4523-8	258		66	4		4
B4269-16	256		63	7		6
Penobscot	254		87	6		4
Catoosa	251		80	5		4
B3353-9	250	*	66	5		4
Viking	231		71	5		3
B4828-4	231	*	67	5		4
B4473-3	224	*	66	7		4
B3139-24	216	*	74	5		5
ND 4192-3	174 ^{4/}		76	9		8
B3725-1	164 ^{4/}		69	5		5
B3309-8	142 ^{4/}	*	62	5		6

Range 18 Sign. Value = 73

Range 2 Sign. Value = 60

^{1/} *Duncan's multiple range test.

^{2/} 1.0 omitted from all specific gravity ratings.

^{3/} **Coughlin's color chart (2-5 satisfactory color).

^{4/}***Plants dead by August 1.

TENNESSEE (Crossville)

T. R. Gilmore

A number of the best seedling varieties from the U.S.D.A. plots at the Cumberland Plateau, Crossville, Tennessee were included in a yield and observation test.

The crop matured very early in 1964, perhaps due to the unusual hot weather in June. Digging was completed the last part of July about two weeks earlier than usual. In spite of this, a good yield of U. S. No. 1 tubers were obtained. Among the whites TL 8117 looked exceptionally good, both from the standpoint of appearance as well as yield. TL 7935 and TL 8134 were the best of the red varieties tested.

Tennessee table 1. Potato yield test of seedling varieties, Crossville, Tennessee, 1964.

Seedling Variety	Parentage	Yield per Acre ^{1/}
		U.S.No. 1
		Cwt.
TL 1859	Pontiac x TL 96-56	378
TL 8117 ^{2/}	LaSoda x TL 1859	278
TL 8194	TL 3769 x TL 6937	269
TL 8240 ^{2/}	ND 2910-1 x TL 1859	261
TL 8134	ND 2910-1 x TL 1859	252
TL 7935	ND 2910-1 x TL 1859	242
TL 7627 ^{2/}	B 606-37 x Cherokee	197
TL 6894	ND 2910-1 x B 3131-8	194
L.S.D. 5%		43

^{1/} Mean yield from 3 replications of 25 hills.

^{2/} White varieties, the others developed red tubers.

TEXAS

Bruce A. Perry, Robert V. Akeley, D. M. McLean
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Screening and Evaluation of Potato Varieties and Breeding Lines

The potato program consisted of evaluating breeding lines in 5-hill plantings at 5 different locations and yield plots at 2 locations within the State. The breeding material was grown at the following locations: (1) Lower Valley, (2) Winter Garden Station, (3) Brazos Valley, (4) Munday, (5) Lubbock and (6) Prairie View. At the Winter Garden Station 43 breeding lines and Red Pontiac were grown in a 25-hill, single replication, plots for yield. Also, 17 breeding lines, plus Red Pontiac were grown in randomized and replicated tests. These yields are reported in Texas tables 1 and 2. A yield test of 24 varieties and breeding lines was grown at Prairie View. The results of this test are reported in Texas table 5. In general, these yields are quite low, probably due to a wet, cold spring.

At the Winter Garden Station a time of harvest, or length of growing season, test was conducted using the varieties Red Pontiac, Kennebec and Red LaSoda. Harvests were made at weekly intervals, beginning after a growing period of 85 days. The results of this test are reported in Texas table 3. It appears from these data that a growing period of about 100 days is required in the Winter Garden area for best marketable yields. In a spacing test at the Winter Garden Station, Red Pontiac was planted at 6, 9, 12 and 15-inches in rows 36 inches apart. The yields increased with a decrease in distance between hills for 9, 12 and 15-inch spacings. The increase was only 8 bags per acre more when going from 9-inch to 6-inch spacing. It would appear from this test that in-row spacings of 9-12 inches would generally be most economical. These results are reported in Texas table 4.

The breeding lines were all rated, at the different locations, for maturity, vigor, productivity, tuber appearance and skin color. Based on these ratings a recommendation was made as to whether the lines should be dropped from the test, repeated, or advanced to replicated yield trials. The selected lines for further study are reported in Texas table 6.

Texas table 1. Twenty-five hill yield test, Winter Garden, 1964.

Variety or Pedigree	Stand Pct.	Yield Per Acre		Variety or Pedigree	Stand Pct.	Yield Per Acre	
		A Size Cwt.	B Size Cwt.			A Size Cwt.	B Size Cwt.
B5016-4	96	235	6	DT5994-2R	96	213	28
IT59190-1R	100	197	37	DT5997-1R	100	325	37
DT5663-1R	100	172	19	DT5997-2R	100	234	28
DT6067-1R	100	167	15	DT6028-2R	100	155	56
BT5043-1R	96	219	31	BT4767-1R	96	282	57
BT5215-1	72	146	17	BT4994-2R	100	246	61
DT5663-4R	96	206	40	BT5003-2	96	166	39
DT5778-1R	100	281	79	BT5043-1R	72	130	15
DT5858-5R	100	248	25	BT5043-2R	84	144	29
DT5946-1R	72	160	16	BT5209-9	100	218	39

continued

Texas table 1, continued.

Variety or Pedigree	Stand Pct.	Yield Per Acre		Variety or Pedigree	Stand Pct.	Yield Per Acre	
		A Size Cwt.	B Size Cwt.			A Size Cwt.	B Size Cwt.
BT5088-7	88	85	15	B4878-21	68	86	20
BT5210-7	92	137	39	B4987-30	96	175	8
BT5220-4	100	119	28	B5006-22	92	82	12
BT5227-2R	100	161	16	B5023-42	92	135	13
B4769-1	100	95	16	B5032-18	64	138	9
B4774-22	96	82	21	B5052-4	80	32	31
B4799-11 (?)	80	227	13	B5089-8	84	143	14
B4824-8R	100	46	30	B5089-18	84	212	9
B4829-8	100	149	11	B5152-20	96	73	14
B4830-1	96	71	30	B5404-2	92	154	6
B4835-8	96	144	16	Red Pontiac	92	261	12
B4878-7	88	84	11				

Planted: January 23, 1964. Harvested: May 12, 1964.

Texas table 2. Replicated yield test, Winter Garden, 1964.

Variety or Pedigree	Stand Pct.	Yield Per Acre		Variety or Pedigree	Stand Pct.	Yield Per Acre	
		A Size Cwt.	B Size Cwt.			A Size Cwt.	B Size Cwt.
IL56317-4	93	183	12	BT5215-1	82	202	59
IL57410-2R	52	115	20	BT5218-3	94	219	32
IL5821-1	85	183	13	BT5219-1	92	273	25
DT5297-1	85	152	26	BT5778-2R	92	177	98
DT5973-3R	91	179	39	B4832-2	69	104	25
DT6048-1R	90	173	25	B4841-3	97	282	80
DT6063-1R	96	222	11	B5088-7	85	164	19
DT6063-2R	98	313	21	DT6028-1R	83	136	53
BT4992-3	100	217	91	Red Pontiac	100	300	12

Planted: January 23, 1964. Harvested: May 13, 1964.

Texas table 3. Yield on different dates of harvest, Winter Garden, 1964.

Variety	85 Days		92 Days		99 Days		106 Days	
	A	B	A	B	A	B	A	B
Red Pontiac	155	12	216	17	239	67	244	73
Kennebec	131	13	177	17	251	19	266	54
Red LaSoda	149	7	205	7	281	14	243	30
Average	145	11	199	14	257	33	251	52

Planted: February 5, 1964. Harvested: April 30, May 7, 14 and 21.

Texas table 4. Yield of seed spacing test with Red Pontiac, Winter Garden 1964.

In Row Spacing	Yield Per Acre	
	A Size	B Size
	Cwt.	Cwt.
6"	350	20
9"	342	16
12"	300	12
15"	258	11

Planted: January 23, 1964. Growing Period 110 Days.

Texas table 5. Yield test, Prairie View, 1964.

Variety or Pedigree	Yield Per Acre			Variety or Pedigree	Yield Per Acre		
	Market- able	Culls	Total		Market- able	Culls	Total
	Cwt.	Cwt.	Cwt.		Cwt.	Cwt.	Cwt.
Triumph	33.0	6.5	39.5	Cherokee	54.7	5.8	60.5
Kennebec	41.3	8.9	50.2	Katahdin	45.7	5.1	50.8
Pontiac	49.2	5.9	56.1	Chippewa	61.1	7.2	68.3
Teton	46.9	6.6	53.5	B605-10	52.2	7.7	59.9
Mohawk	67.2	5.1	72.3	Saco	37.6	4.7	42.3
Delus	45.6	5.6	51.2	Boone	43.0	3.9	46.9
White Rose	58.0	8.3	64.3	Pungo	58.0	7.4	65.4
Green Mountain	64.7	8.2	72.9	TL 8117	48.8	5.6	54.4
Irish Cobbler	50.2	11.5	61.7	TL 7935	34.2	5.8	40.0
Plymouth	31.4	4.4	35.8	TL 8197	51.8	6.5	58.3
Early Gem	66.5	6.4	72.9	LaSoda	59.9	4.7	64.6
				TL 8131	51.7	6.0	57.7
				LaChipper	41.6	5.9	47.5

Planted: March 2, 1964. Harvested: June 8, 1964. Insecticide: 10% D.D.T.
Fertilizer: 1000 pounds 12-12-12 per acre applied in bed.

Texas table 6. Potato breeding selections, 1964.

Pedigree	Parentage	Resistance in Cross	Pedigree	Parentage	Resistance in Cross
IL57410-2R	La.1354xI 1027-18	Sc, Lb, Xi	B5088-7*	B605-10xB3692-4	-
IL5821-1	I801-10xI 872-4	"	BT5043-1R	B789-388xKatahdin	Lb, AI, Lr
DT5297-1	B962-9xB4525-2	Lb, Sc	DT5778-1R	RedkotexB4468-1R	Lb, Sc
DT5973-3R	B4303-3Rx B4468-1R	"	DT5858-5R	I 1213-1x	"
DT6063-1R*	B4750-2RxLa.1859	"	DT5946-1R	B3692xB4916-6R	Lb, Sc, X
DT6063-2R*	" x "	"	DT5994-2R	B4468-1Rx B2853-3R	" " XI, Vw, Lr
BT4992-3	B294-29xRedskin	Sc, AI	DT5997-1R	" x B4811-6R	" "
BT5215-1	B3391-2xB3139-24	-	DT5997-2R*	" x "	" "
BT5218-3	B3725-1xB3950-1	-	BT4767-1R	SebagoxRedskin	-
BT5219-1	B4146-4xYampa	-	BT4994-2R	B929-3xB3556-12	-
BT5778-2R	RedkotexB4468-1R	-	BT5003-2	B3139-24xB4154-2	Lb, Sc, Rr, Yr, Vw, Lr
B4841-3	B3950-1xB3139-24	Lb, Sc, Rr, XI, AI, YR, Vw			

continued

Texas table 6, continued.

Pedigree	Parentage	Resistance in Cross
BT 5016-4	B3725-1 x Yampa	Lb, Sc, AI, RK Nem.
BT 5043-2R	B789-388 x Katahdin	AI, Yr, Lr
BT 5209-9	B294-29 x Merrimack	-
BT 5220-4	B4154-2 x B2834-4	-
B 4829-8	B3139-24 x B3478-45	-
B 4835-8	B3556-12 x "	-
B 4987-30	47156 x B3139-24	-
B 5089-8	B606-3 x B3692-4	-
B 5089-18	" x "	-
B 5404-2	Plymouth x X1276-185	Lb, Sc, AI, Lr, Crspt.
B 5215-2	B3391-2 x B3139-24	-

* Advance to replicated yield plots.

VERMONT

Wilfred R. Kelley, Richard Jensen, and Hugh Murphy

During 1964 a single variety trial of fifteen entries was conducted at Hardwick, Vermont as part of the Tri-State cooperative variety trial program. The plots in Vermont were planted on May 18 and harvested October 8. The plots consisted of five replicates of each variety arranged in a randomized block design. Fertilizer applied was 150-225-225 per acre. Varieties were spaced eight inches apart, except for Ona and WY1122 which were spaced ten inches apart.

Apparently moisture and temperature conditions were very favorable for high yield at Hardwick in 1964. Harvesting conditions were wet and cool for most of the Tri-State potato areas in 1964.

Vermont table 1. Yield, specific gravity, percentage of yield between 1 7/8 to 4 inches in size, and chip color index for 15 potato varieties grown at Hardwick, Vermont, 1964.

Variety	Yield Per Acre Cwt.	Specific Gravity	Chip Color Index	1 7/8 to 4 inches Pct.	2 1/4 to 4 inches Pct.
Houma	335	1.067	8.9	94	80
Alaska 114	321	66	8.2	94	69
Green Mountain	313	67	9.6	96	80
Shoshoni	312	64	8.8	96	83
Saco	308	71	7.8	94	76
Ona	303	68	8.0	95	78
Pungo	300	68	7.2	92	82
Menominee	278	69	8.4	94	76
Katahdin	277	65	7.5	95	81
Early Gem	272	61	8.6	95	74
WY1122	272	62	8.6	94	76
Russet Burbank	253	74	7.6	47% 4-10 oz.	
Penobscot	236	72	8.5	93	68
Hunter	216	72	8.6	90	63
Reliance	131	61	9.2	91	76
LSD 0.05	42	03			

VIRGINIA
M. M. Parker

1964 Potato Test Plots in Eastern Virginia

Nineteen named varieties and eighteen seedling lots, obtained through the National Potato Breeding Program, were in the 1964 potato variety plantings at the Eastern Shore Branch of the Virginia Truck Experiment Station.

Previous tests of the seedlings had shown that some of them had properties which might be made use of in the Virginia variety improvement program. They were, therefore, being tested in a more detailed manner in 1964.

The named varieties in the test were mostly newly introduced ones with some of the older, standard kinds also included. Pungo, the commercial potato of eastern Virginia, was used to determine the comparative value of both the seedlings and the named varieties.

Treatment of the seed prior to planting consisted of putting the uncut tubers through a warming period of several days after being taken out of cold storage. They were next cut into seed pieces somewhat more than one ounce in weight and held at warm temperatures until the cut surfaces had healed.

The soil on which the test plots are located is a Sassafras sandy loam. A winter cover crop of rye is plowed under each year shortly before planting. At planting a 10-10-10 fertilizer mixture is put in bands at the rate of 1000 pounds to the acre in rows 3 feet apart.

The seed pieces are dropped by hand 12 inches apart, midway between the bands of fertilizer. The seed is then covered with a high ridge of soil to protect it from possible damage by low soil temperatures and from excess soil moisture.

Potatoes that are grown commercially in Virginia are produced both for fresh table use and for processing into chips. Appearance of the tubers is therefore almost equally as important to the grower when the potatoes are marketed in the fresh state as are such things as good yields.

The 1964 season in eastern Virginia was not a favorable year to get good yields of potatoes, but it was one that brought out the inherent ability of a variety to withstand or succumb to adverse climatic conditions and to produce good looking potatoes, or the reverse.

A spell of low temperatures just about the time the sprouts were near ground level lowered the soil temperature, particularly in the very sandy areas, to a point where injury occurred to the sprout tip, causing a long delay and irregular emergence of the plants above ground.

Later, a prolonged hot, dry spell in combination with the use of sporadic overhead irrigation caused alternating periods of growth and inactivity. The result was that there was considerable field sprouting of the tubers of those varieties susceptible to this weakness, second growth deformities on those kinds susceptible to this trouble, and erratic yields, even within the replicate of a variety.

The 1964 yields, therefore, in the Virginia test plot, were not indicative of a variety's true capacity to produce, but the ability or the lack of it, of a variety growing under unfavorable climatic conditions to form tubers unmarred by field sprouts or second growth abnormalities, was considered hereditary and well worth recording.

Virginia table 1 shows the rating that the named varieties and the seedling lots were given when judged solely by their appearance when intended for fresh market use. The rating took into consideration the uniformity of the size of the tubers, their freedom from field sprouting, and the quantity and size of second growth malformations. Virginia table 2 gives the data obtained from eleven of the named varieties evaluated at bi-weekly intervals over a period of 6 weeks for chip color, chip color stability and dry matter content of the tubers. The values were furnished by James Watts, Wise Potato Chip Company, Berwick, Pennsylvania.

In general, those varieties which made chips of good color over a lengthy holding period in 1963 also made desirably colored ones in 1964. The dry matter content of the potatoes, however, in a given variety in 1963 was much higher than in 1964. This possibly could be explained by the more favorable growing conditions in 1963 and probably because there was a better and more uniform maturity of the vines.

Virginia table 1. Fresh market appearance rating of 16 varieties and 10 seedlings grown at Painter, Virginia, 1964.

<u>Varieties</u>	<u>Varieties</u>	<u>Seedling Lots</u>
Superior	LaChipper	B 859-10
Haig	Keeweenaw	B 4683
Pungo	Alaska 114	B 605-10
Alleghanna	Avon	Fungo
Sebago	Norland	B 962-32
Pennchip	Penobscot	B 4084-8
LaSoda	Shoshoni	F 5025
Hunter	Rushmore	T. L. 7627-9
		B 3856-7

Virginia table 2. Chip color stability and dry matter content of 11 varieties grown at Painter, Virginia, 1964 ^{1/}

<u>Variety</u>	<u>Average ^{2/}</u> <u>Chip Color</u>	<u>Percent ^{2/}</u> <u>Dry Matter</u>	<u>Variety</u>	<u>Average ^{2/}</u> <u>Chip Color</u>	<u>Percent ^{2/}</u> <u>Dry Matter</u>
Pennchip	2.0	17.5	Pungo	5.5	17.1
Superior	2.9	16.5	Alaska 114	5.9	15.2
Avon	3.8	16.2	Keeweenaw	6.6	13.3
Haig	4.5	15.6	Norland	6.6	12.5
LaChipper	4.7	15.6	Shoshoni	7.9	13.7
Penobscot	4.8	15.4			

^{1/} Data furnished by James Watts, Wise Potato Chip Company, Berwick, Pennsylvania.

^{2/} Chip color key: 1-4, usable; 5, usable but not desired; 6-14, unacceptable.

WASHINGTON
Wm. G. Hoyman

Twelve of the 13 parents used in the breeding program had russet skin and most of them had resistance to Verticillium albo-atrum. High specific gravity and resistance to the pathogens causing common scab, late blight, virus X and leafroll were inherent to certain parents. Because of the advantages derived from Gro-lux fluorescent lights, the parents were planted in the greenhouse the forepart of December, 1963 and most of the crossing was completed by April 1.

The first-year seedling program was enlarged from 40,000 to 50,000. These were planted in May and harvested in September. Two screenhouses were used for growing the first-year seedling crop.

Approximately 33,500 seedling tubers were planted in the field at the Irrigation Experiment Station, Prosser, Washington. Thirty-seven russet and 17 white hills were saved for further evaluation in 1965.

The advanced selections 12-3, 48-1, B3620-1 and B5063-3 were increased at the Signal Peak Ranger Station, Mt. Adams. A severe frost July 22 reduced the yield 75 percent. The russet selection 12-3 was also increased at the Dry Land Experiment Station, Lind, Washington. Approximately 800 pounds are available for increase and further evaluation. The tubers of this selection are long with slightly higher specific gravity than Russet Burbank. During the brief time it has been tested it has shown resistance to the pathogens causing Verticillium wilt, common scab, leafroll and late blight. Observations made in test plots indicate it may yield as well or better than Russet Burbank. Chipping tests have been favorable.

The white selection 48-1 has some qualifications needed in new processing varieties. When compared to Kennebec by a processor of French fries, it was slightly superior. Among 32 varieties and selections in the 1963 yield trial (Kunkel and Hoyman), it ranked fifth in total yield with 660 cwt. per acre and 78 percent No. 1's. Its specific gravity (1.091) was comparable to Kennebec and Russet Burbank but it had a lower bruising index than these 2 varieties. This is very important to the processor. 48-1 has shown a high degree of resistance to the leafroll virus and common scab has not occurred on it in Washington soils. It does not have as much resistance to Verticillium albo-atrum as 12-3.

The selections 48-1, B3620-1 and B5063-3 have been released to Washington seed growers for increase.

Three hundred and sixty-five pounds of seedling tubers from 17 families were sent to Dr. S. A. Alfieri, Potato Field Station, Greeley, Colorado, for planting in his Cheyenne, Wyoming, seedling plot.

WASHINGTON
R. Kunkel and W. G. Hoyman

The 1964 potato variety trial was planted on April 28 with the W.S.U. press wheel potato planter. Fertilization consisted of 350 pounds per acre of nitrogen from ammonium nitrate, 390 pounds per acre of P_2O_5 from triple-superphosphate and 312 pounds per acre of K_2O from muriate of potash. The fertilizer was applied in two bands about two inches to the side and two inches below the bottom of the seed piece at planting time. The land had been under irrigated farming since 1961. The seed pieces were spaced 10 inches apart and the rows were spaced 34 inches apart. Furrows were made for irrigation, but no cultivation or hilling was done. Mechanical weeding was done early in the season with two weeder blades which formed an open "V" and which scraped the soil surface about one inch deep and pushed the soil against the base of the plants.

More fertilizer was used in 1964 than in previous years, and the growing season was cooler than normal. Whether it was the added fertilizer, the cooler season or a combination of both which caused the exceptionally high yields is not known. Irrigation, insect control and disease control practices were similar to those used in other years.

Harvesting was done on October 21 and 22. Total yields, per cent No. 1 grade and specific gravity values are the means of five replications (Kunkel table 1). Chip color is based on two tubers from each of three replications. The slices were .058 inches thick and were fried until bubbling ceased at 375° F. These potatoes had never been subjected to temperatures below 55° F., not even for a short period of time, and were at 70° F. between November 5 and November 9. Specific gravity and chip color measurements were made November 9, 10 and 11. Chip colors are based on the color chart put out by the National Potato Chip Institute. Values of 4, 5 and 6 are acceptable. Samples are in 40° F. storage to test the response of the tubers to cold.

Kunkel table 1. Potato varieties grown at Othello, Washington, 1964.

Variety	Yield Per Acre		1/ Specific Gravity	Chip Color
	Total Cwt.	U.S.No.1's Pct.		
396.55-3	1003	90	82	5.6
A503-42	976	83	93	6.0
Redskin	964	85	79	7.0
Golden Chip	889	76	90	5.0
A576-2	880	54	93	7.0
A465-11	863	69	97	8.0
A170-9	844	76	89	6.0
Golden Chip	843	75	87	5.6
456-9	830	89	81	5.3
Shoshoni	803	79	86	8.0
Ona	793	87	92	7.0
A598-101	792	74	96	5.0
Russet Burbank (Idaho)	790	83	96	5.6
Penobscot	786	82	95	6.0
Red McClure	781	78	97	5.0

continued

Kunkel table 1, continued.

412.55-2	775	84	78	7.0
B2894-24	770	78	81	6.0
A492-2	764	85	98	8.3
A483-6	755	72	97	5.0
48-1	747	85	84	8.6
B3353-9	730	85	77	6.0
B3692-4	729	82	82	5.6
E3696-13	723	86	83	7.0
A466-2	723	59	96	6.0
Redbake	706	88	81	6.0
Allehanna	704	77	83	7.0
B4123-10	704	82	72	8.3
B3802-15	703	90	84	6.0
B4828-4	701	85	67	6.3
CS 13951	697	81	88	6.0
Blanca	690	87	91	7.0
Rushmore	690	82	77	6.3
Pennchip	684	80	77	5.0
Haig	670	88	79	5.6
ND 4524-7R	657	88	75	4.6
Norland	652	90	67	5.6
ND 4192-3	650	92	81	7.9
412.55-2	647	84	78	5.0
Russet Burbank				
(Montana)	647	79	93	5.0
156.51-2	646	87	101	6.0
11-29	644	85	91	8.0
CS 13928	621	85	92	7.0
ND 4192-3	614	90	81	7.0
Navajo	606	88	88	6.0
22.49-1X	581	87	81	6.0
CS 11889	570	80	83	7.3
ND 3676-20	569	80	86	6.0
81.55-1	467	86	84	7.3
LSD 5%	118	10	55	
1%	155	14	73	

WISCONSIN
P. R. Rowe

Genetics and Cytogenetics of the tuber-bearing Solanum species.
(Cooperative ARS, USDA and Wisconsin Station)

Problems related to ploidy and crossability in haploids of S. tuberosum L. and the tuber-bearing Solanum species were continued in 1964. Studies receiving particular emphasis included: (1) evaluation of haploids derived from S. tuberosum, (2) evaluation of various hybrids between haploids and diploid Solanum species, and (3) evaluation of the effects of ploidy on fertility and tuber development of some S. phureja-haploid hybrids.

Six hundred and sixty haploids derived from 71 varieties or breeding stocks of S. tuberosum subspecies tuberosum were evaluated in the field at Sturgeon Bay. Thirty-four percent flowered sufficiently to be tested for female fertility in crosses with diploid species or diploid species-haploid hybrids. Seventeen percent of the haploids shed sufficient pollen to permit testing for male fertility.

Tuber families of 3 types of hybrid combinations involving haploids and diploid Solanum species were compared in the field for fertility and tuber yield (Rowe table 1). Families resulting from the initial cross of a diploid species with a haploid are usually very vigorous and fertile but have poor tuber characteristics. Crossing an F₁ clone with a haploid produced families with markedly improved tuber characters with no decrease in yield, but flowering and fertility were reduced. Intermating the F₁ clones produced families with good fertility and yield but on the average tuber shape and eye depth were not as good as in the backcross families.

Fifteen diploid F₁ clones of S. phureja-haploid matings were compared with their vegetatively doubled counterparts. Two hills of each 2X - 4X comparison were grown side by side in adjacent rows. An incomplete diallel series of matings in which equivalent crosses were made at each level of ploidy was used to compare male and female fertility. All crosses were made in an air-conditioned greenhouse using the decapitation technique. The doubled clones set approximately half as much seed per fruit as the diploids (Rowe table 2). The tetraploid clones also were crossed reciprocally with the variety Katahdin. When Katahdin was used as the male, 100% of the crosses were successful but only 43% of the reciprocal matings set seed.

The diploid clones produced more total tubers (including tubers down to 1/2 inch in diameter) and more total weight per plant (Rowe table 3). The tetraploid clones, however, produced more tubers over 2.5 inches in diameter and the average weight per tuber was greater. Although care was taken to plant green sprouted tubers of equal weight for both ploidy levels, the diploid seed tubers were physiologically older and produced more emerging sprouts. Four weeks after planting the diploid plants averaged 2.9 stems per hill and the tetraploids 2.1. Although later in the growing season, the vegetation appeared equal for both ploidy levels, these initial differences may account for the greater number of tubers being set by the diploids. No differences were observed for tuber shape, depth of eye, or flowering date.

In seedling families of crosses between diploid clones of S. phureja-haploid hybrids and equivalent crosses between the tetraploid counterparts, the tetraploid seedlings were more vigorous and produced more and heavier tubers (Rowe table 4). These families were started from true seed and transplanted to the field. The tuber families will be compared for yield and fertility next year.

To provide material for studying the influence of ploidy on development of S. tuberosum stocks, 37 haploid clones were treated with .5% colchicine for 24 hours. The resulting 128 doubled cuttings represented 22 different haploids. These results (59% of the treated clones doubled) are similar to the data reported last year for F_1 clones of S. phureja-haploid matings.

Thirty-nine seed and 1398 tuber lots of materials developed by this project were sent to 6 states and to Canada.

Rowe table 1. Tuber production and flowering of S. phureja-S. tuberosum haploid combinations.

Type of cross	Number of families	Tubers/plant	Weight/plant pounds	Weight/tuber pounds	Percent of plants flowering	Percent of plants flowering with No. pollen	Sparce pollen	Abundant pollen
DXH	10	16.4	1.51	.09	87.9	3.2	29.4	67.3
HXDH	28	17.6	2.56	.15	54.2	56.9	32.8	10.6
DHXDH	24	18.7	2.76	.15	92.7	3.2	38.4	58.4

H = haploid from S. tuberosum. 2 replications

D = diploid species, S. phureja.

Planted May 27, harvested September 14.

Rowe table 2. Seed set of 7 selected diploid clones of S. phureja--S. tuberosum haploid crosses and their vegetatively doubled counterparts.

Type of cross	Crosses attempted	Successful crosses	Total fruit	Seed/fruit	
2X-2X	22	20	91%	53	87.25
4X-4X	21	10	48%	22	41.95
4X-Katahdin	7	7	100%	25	38.0
Katahdin-4X	7	3	43%	5	18.6

Rowe table 3. Tuber production of 15 selected diploid clones of S. phureja--S. tuberosum haploid crosses and their vegetatively doubled counterparts.

Ploidy level	Tubers per hill				Weight per hill in lbs.				Weight per tuber in lbs.			
	A	B	C	Total	A	B	C	Total	A	B	C	Total
2X	11.9	9.5	1.3	22.7	.46	1.45	.39	2.32	.04	.15	.30	.10
4X	5.0	5.7	2.0	12.8	.22	1.04	.77	2.04	.04	.18	.37	.16
A	Tubers .5-1.5 inches in diameter.							Planted May 25.				
B	Tubers 1.5-2.5 inches in diameter.							Harvested September 2.				
C	Tubers larger than 2.5 inches in diameter.							2 replications.				

Rowe table 4. Tuber production of diploid and tetraploid seedling families.

Ploidy level	Percent of plants tuberizing	Tubers/plant	Weight/plant lbs.	Weight/tuber lbs.
2X	80.6	9.9	.300	.031
4X	91.8	12.5	.631	.050

10 families, 20 plants per family, 2 replicates.

Transplanted to field June 4; harvested September 3.

WISCONSIN
W. L. Beale,^{1/} Darrell Hunter,^{2/} and F. J. Stevenson^{3/}

Frito-Lay, Incorporated Potato Breeding Program

The 1964 program included replicated yield tests and observation plots in Alabama, plus the routine program at the Rhinelander Research Farm. Increasing new seedlings, testing of advanced seedlings and replicated yield tests constituted the bulk of this work. In Madison, seedling production and pollination work as well as routine processing evaluation of advanced selections were carried out.

Madison Greenhouse

In 1964, parents were selected for their ability to transmit to their progenies, usable chip color under various storage treatments, high specific gravity, high yield, good tuber shape, and a high degree of self fertility. Some parent varieties were selected for their resistance to prevalent diseases, and others for their adaptability to certain geographical areas of the country. A total of 510 crosses were made and an estimated total of 348,960 seeds produced. Approximately 18,210 seedlings were grown in 2½" pots.

Rhinelander Research Farm

Seedlings, First year in the field: Approximately 30,000 new seedlings were grown. Of these, 18,200 were grown from seed in the Madison greenhouse, and 11,800 were received from the National Potato Breeding Program at Beltsville, Maryland. Approximately 4.5% were selected for further testing.

Seedlings, Second year in the field: Approximately 2800 selections were grown for the second year. Of these 810 were saved and samples of each placed in storage at 50°, 42°, and 38° for processing evaluation.

Seedlings, Third year in the field: 190 selections were planted in blocks of four 28-hill rows. Eighty-two clones were selected for further testing from the various storage conditions.

Seedlings, Fourth year in the field: 81 selections were planted in blocks of six 48-hill rows, 69 were selected for further testing.

Parent Plot: Eighteen named varieties and 300 numbered varieties were grown in the parent plot in single, 24-hill rows. A duplicate parent plot was also grown in a different location to help prevent losses due to disease.

Increase Plot: Approximately 150 advanced seedling varieties were increased for further testing. These were planted in blocks of six 48-hill rows with 18" spacing between hills, and an 18" skip between 4-cut tuber units. This spacing was utilized to facilitate field inspection and roguing. All varieties were saved for further testing.

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1963 Winter Potato Chip Color Tests

Winter storage tests for chip color were completed too late to be included in the 1963 report, so are included here. Three tests were made by maturity groups. One of the early maturing varieties, one on medium and one on late varieties. Kennebec was used as a check in each case.

Yield Test A: A summary of the performance of 34 early maturing varieties in comparison to Kennebec is given in table 1. This shows the breakdown of chip scores, giving the number of varieties scoring significantly higher, in the same class, or significantly lower than the average Kennebec score for each of eight different storage conditions. This separation has been based on appropriate LSD's at the 5 percent level. Test results were obtained during the spring of 1964.

Yield Test B: A summary of the performance of 32 medium maturing varieties in comparison to Kennebec is given in table 2. The procedure was the same as outlined for Yield Test A.

Yield Test C: A summary of the performance of 29 late-maturing varieties in comparison to Kennebec is given in table 3. The same procedure as above was followed.

Rhineland Replicated Yield Tests, Fall of 1964: The 1964 Yield Tests were divided into 4 plots by maturity groups. Each group included Kennebec as a check. The plot design was a randomized block, with 4 replications of 20 hills each for each plot, or sub-plot. The spacing was on a 12 x 36 inch basis. Fertilizer was applied at the rate of 750 pounds per acre of 8-32-16S in the row at planting, with 250 pounds per acre of ammonium nitrate applied as a side dressing 30 to 40 days after planting.

Yield Test A consisted of 24 early varieties plus Kennebec, and was planted May 7. Four reps were harvested August 5 and a second series of 4 reps was harvested on September 8.

Yield Test B consisted of 25 medium varieties and Kennebec. The planting and harvest schedule was the same as for Yield Test A.

Yield Test C included 16 medium-late varieties plus Kennebec as a check. These were planted May 7 and Early Harvest was made on August 7. The Late Harvest series was taken on September 11.

Yield Test D was composed of 28 late varieties and Kennebec. Planting and harvest schedules were the same as for Yield Test C.

Data covering the yield performance of these four test plots is compared with Kennebec in Table 4. These comparisons have been made on the basis of the appropriate LSD's at the 5% level.

Frito-Lay table 1. Summary of the 1963 data for chip color for 34 early-maturing varieties in comparison with Kennebec for 8 storage treatments.

Storage Treatment	Kennebec Score for each test	LSD 5 Percent	No. of Var. Sig. Higher	No. of Var. Same Class	No. of Var. Sig. Lower
50° Direct	85	3	14	20	0
45° Direct	76	4	22	12	0
45° 2 Weeks	80	4	28	6	0
42° Direct	78	5	11	22	1
42° 2 Weeks	85	6	0	33	1
42° 4 Weeks	89	4	0	31	3
38° 2 Weeks	79	6	3	26	5
38° 4 Weeks	78	5	15	19	0

Frito-Lay table 2. Summary of the 1963 data for chip color for 32 medium maturity varieties in comparison with Kennebec for 8 storage treatments.

Storage Treatment	Kennebec Score for each test	LSD 5 Percent	No. of Var. Sig. Higher	No. of Var. Same Class	No. of Var. Sig. Lower
50° Direct	88	NS	0	32	0
45° Direct	80	4	19	11	0
45° 2 Weeks	88	NS	0	32	0
42° Direct	83	6	1	31	0
42° 2 Weeks	85	5	0	26	6
42° 4 Weeks	90	5	0	30	2
38° 2 Weeks	78	5	11	21	0
38° 4 Weeks	84	5	1	27	4

Frito-Lay table 3. Summary of the 1963 data for chip color for 29 late varieties in comparison with Kennebec for 9 storage treatments.

Storage Treatment	Kennebec Score for each test	LSD 5 Percent	No. of Var. Sig. Higher	No. of Var. Same Class	No. of Var. Sig. Lower
50° Direct	88	NS	0	29	0
45° Direct	77	5	17	12	0
45° 2 Weeks	88	NS	0	29	0
42° Direct	79	5	16	12	1
42° 2 Weeks	87	NS	0	29	0
42° 4 Weeks	89	NS	0	29	0
38° 1 Week	70	5	11	17	1
38° 2 Weeks	79	5	17	12	0
38° 4 Weeks	81	5	18	11	0

Frito-Lay table 4. Summary of replicated yield tests, August and September, 1964.

Yield Test and Date	Ave.Yield Per Plot No. 1 *	Kennebec Yield No.1/Acre	LSD 5 Percent Cwt/Acre	No.of Var. Sig.Higher	No.of Var. Same Class	No.of Var. Sig. Lower
A-Aug. <u>1</u> /	112	91	27	11	12	1
A-Sept.	188	273	22	0	1	23
B-Aug. <u>2</u> /	117	91	11	19	4	2
B-Sept.	201	258	24	2	3	20
C-Aug. <u>3</u> /	116	99	13	11	2	3
C-Sept.	159	244	26	0	1	15
D-Aug. <u>4</u> /	98	109	11	6	9	13
D-Sept.	219	286	32	0	5	23

* No. 1 Yield in Cwt., was based on over 1-7/8 inch diameter in August, over 2 inch in September.

1/and 2/ August harvest after 92-day growing season and September harvest after 116-day growing season.

3/and 4/ August harvest after 94-day growing season and September harvest after 121-day growing season.

Alabama 1964

Late Observation: One hundred and three seedling varieties were included in the late observation plot. Ten of these varieties were selected for replanting in Alabama in 1965.

Replicated Varietal Test: Twenty-five varieties were included in the replicated yield test. Five of these were saved for retesting in 1965.

Early Observation: Twenty-five varieties were included in the early observation plot. The five varieties selected for replanting from the varietal plot were also based on this early observation plot. One purpose of this plot is to learn something of the vine resistance to frost conditions in early stages of growth. Of special interest is the ability to resprout without being replanted, after being frosted back to ground level.

WYOMING

W. A. Riedl, L. A. Schaal, W. H. Powell and Ming Chin Liu

Two replicated performance trials were conducted at Laramie, and one each at the Torrington and Powell substations. A frost on August 19 at Laramie severely reduced the yield. The results of these trials are shown in Wyoming tables 1, 2, 3, and 4. Seedling 2850 produced the highest yield of U. S. No. ones in 3 of the 4 trials and the second highest in the other trial. It has round red skin tubers with above average specific gravity. It is resistant to scab. It is planned to increase and test this seedling at several locations next year.

Twelve seedling families were grown at Laramie and selections were made. The observation trial consisted of 100 seedlings planted in 4-hill units, and 30 seedlings planted in 40-hill rows. Seven seedlings were increased at Laramie, and 15 at the Torrington substation. Fifteen seedlings were tuber indexed and increased at the Cheyenne Horticultural Field Station.

Wyoming table 1. Potato variety trial, Laramie, Wyoming, 1964.

Variety or Seedling	Total Yield Per Acre	U.S. No.1 Yield Per Acre ^{1/}	U. S. No. 1's Rank	U. S. No. 1's Pct.	Stand Pct.	Specific Gravity
	Cwt.	Cwt.				
2850	109	101	1	93	84	1.064
Norland	103*	95*	2	92	90	59
Red Pontiac	98*	82*	5	84	88	58
Early Gem	95*	85*	3	89	87	60
Haig	94*	84*	4	89	86	70
Red LaSoda	89	76	6	85	81	64
2903	79	73	7	92	84	73
Teton	76	66	9	87	94	66
2753	76	70	8	92	94	68
3130	76	64	11	84	79	68
Kennebec	75	65	10	87	94	66
2980	71	63	12	88	78	56
Katahdin	66	55	15	83	80	60
3149	64	56	14	88	91	59
3086	63	59	13	94	59	68
3085	41	35	16	85	81	61
General Mean	80	71		88	84	64
LSD (5% Level)	16	17				

^{1/} 1½ inch minimum.

* Statistically equal to highest yield at the 5% level. Previous crop--alfalfa. Date planted--May 21. Planted in one-row plots, 40 ft. long, with 4 replications. Rows spaced 3 ft. apart with hills spaced 1 ft. apart. Fertilizer--160 lbs. Treble super phosphate per acre. Irrigated--July 10, 26, and August 14. Dusted with sulphur and 5% DDT July 7, 25. Rogued--July 15, 30 and August 21. Date of frost--August 19 (10-20% damage), killing frost September 17. Date of harvest--September 29. Date graded--November 18.

Wyoming table 2. Potato seedling performance trial, Laramie, Wyoming, 1964.

Seedling Number	Total Yield Per Acre	U.S. No.1 Yield Per Acre ^{1/}	U. S. No. 1's	U. S. No. 1's	Stand	Specific Gravity
	Cwt.	Cwt.	Rank	Pct.	Pct.	
3092	132	113	1	86	83	1.062
2850	123*	108*	2	88	84	64
3165	119*	95*	5	80	59	--
2903	104	96*	4	92	87	--
3155	93	81	3	87	81	58
2976	85	77	6	91	76	60
3028	78	69	7	88	78	--
2578	73	64	8	88	71	68
2795	72	63	9	88	58	70
3182	64	52	10	81	81	--
2277	53	47	11	89	85	--
3055	49	44	12	90	59	--
3105	46	39	13	85	48	--
3023	35	28	14	80	46	--
General Mean	80	70		87	71	1.064
LSD (5% Level)	22	22				

^{1/} See footnote 1 table 1.

Wyoming table 3. Potato variety performance trial, Torrington Substation, 1964.

Variety or Seedling	Total Yield Per Acre	U.S. No.1 Yield Per Acre ^{1/}	U. S. No. 1's	U. S. No. 1's	Stand	Specific Gravity
	Cwt.	Cwt.	Rank	Pct.	Pct.	
Early Gem	240	64	13	27	76	1.070
Norland	231*	139*	3	60	93	67
Red Pontiac	220*	153*	2	70	86	68
Teton	213*	135*	4	63	84	70
Kennebec	212*	128*	5	60	84	73
2850	207*	160	1	77	84	69
Katahdin	201	121	6	60	90	78
2903	193	109	7	56	79	82
Catoosa	174	96	10	55	76	70
Red LaSoda	173	105	8	61	94	68
Haig	163	102	9	63	69	82
2753	161	86	11	53	89	71
3088	140	80	12	57	94	70
3185	110	62	14	56	51	81
Cayuga	85	30	16	35	87	78
2801	80	52	15	65	60	64
3094	57	22	17	39	78	74
General Mean	168	97		56	81	73
LSD (5% Level)	35	32				

^{1/} 1-7/8 inch minimum. *Statistically equal to the highest yield at the 5% level. Previous crop--alfalfa. Date planted--May 18. Planted in one-row plots, 35 ft. long with 4 replications. Rows spaced 3 ft. apart with hills spaced 1 ft. apart. Irrigated --July 6, 19, August 6, 16, and September 4. Sprayed with DDT July 13 and 23. Rogued--July 9. Date of killing frost--September 27. Date harvested--September 30. Date graded--November 13.

Wyoming table 4. Potato variety performance trial, Powell Substation, 1964.

Variety or Seedling	Total Yield Per Acre	U.S. No.1 Yield Per Acre ^{1/}	U. S. No. 1's Rank	U. S. No. 1's Pct.	Stand Pct.	Specific Gravity
	Cwt.	Cwt.				
2850	355	278	1	78	83	1.085
Red LaSoda	330*	230*	2	70	95	77
Teton	278	213*	4	77	93	78
Katahdin	270	190	7	70	85	94
Red Pontiac	270	201	5	74	83	73
Norland	261	223*	3	85	89	78
Kennebec	259	192	6	74	87	78
Early Gem	258	159	9	62	93	72
Haig	252	154	8	69	83	83
General Mean	281	207		73	88	80
LSD (5% Level)	49	65				

^{1/} 2" minimum. *Statistically equal to highest yield at the 5% level. Previous crop--soybeans. Date planted--May 16. Planted in one-row plots 30 ft. long with 4 replications. Rows spaced 3 ft. apart with hills 1 ft. apart. Fertilizer--manured at the rate of 15 tons per acre. Rogued--July 23. Date of killing frost --September 19. Date of harvest--October 6. Date graded--October 7.

